

THE RAILWAY GAZETTE

A Journal of Management, Engineering and Operation
INCORPORATING

Railway Engineer • TRANSPORT • The Railway Netw
The Railway Times • Herapaths Railway Journal • RAILWAY RECORD.
RAILWAYS • ESTABLISHED 1835 • THE RAILWAY OFFICIAL GAZETTE

PUBLISHED EVERY FRIDAY

33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1

Telegraphic Address: "TRAZETTE PARL., LONDON"
Telephone No.: WHITEHALL 9233 (6 lines)

Annual subscription payable in advance and postage free:

British Isles and Abroad £2 5s. 0d.
Single Copies One Shilling

Registered at the General Post Office, London, as a Newspaper

VOL. 71 No. 8

FRIDAY, AUGUST 25, 1939

CONTENTS

	PAGE
Editorials	269
Letters to Editor	274
Publications Received	277
The Scrap Heap	278
Overseas Railway Affairs	279
Results of Improvements to French Locomotives	281
New Arrival Indicator at Waterloo	284
Road Transport Section	285
Railway News Section	295
Home Railway Returns for 1938	298

Railway Wages

ONCE again the railway trade unions have come to the cross roads. We recorded last week the fact that the Associated Society of Locomotive Engineers & Firemen met the general managers, and it was to be hoped that a satisfactory solution of the problem confronting the bodies could be found. Unfortunately this much-to-be-desired result was not achieved, and the companies intimated that in granting the increase in the minimum rate of the lowest paid men they had made the maximum concession justifiable in the present financial position of the railway industry. In these circumstances the companies had no alternative but to decline the application of the society. The companies suggested, however, that if the society desired to pursue its claims it should refer them to the Railway Staff National Tribunal for consideration in the light of the altered conditions of today, and if the society decided to adopt this suggestion the companies would do everything possible to expedite a hearing. The society claimed that its application had already been heard by the tribunal and it was now free to take whatever further action it might consider necessary to enforce its demands. This of course could mean only strike action, and at a meeting of the society's executive committee on Tuesday last it was decided to withdraw at midnight tomorrow (Saturday) the labour of engine drivers, firemen, and engine cleaners on the four main-line railways. The attitude of the National Union of Railwaymen was decided at a delegate conference specially summoned for Tuesday last, and it appeared that the unions were acting quite separately, as the N.U.R. has declared against strike action. The A.S.L.E.F. decision will not affect London Transport motormen. A railway strike at any time is something to be avoided, and at the

present moment, in the light of the international situation, it is unthinkable. It cannot be too late, even on this Friday, to reverse the runaway engine and to avoid so unforgivable a crime as a strike in these anxious days.

* * * *

The Fifty-Shilling Wage

When the National Union of Railwaymen's claim for a minimum wage of 50s. a week was before the Railway Staff National Tribunal in January last it was stated, on behalf of the railway companies, that in March, 1938, there were approximately 101,000 Conciliation staff rated at less than 50s. a week, but that the number of adult male Conciliation staff whose earnings are below 50s. a week does not exceed 58,000. This is explained by the additional payment for overtime and Sunday duty earned under regular rota arrangements by so many men in the grades affected. The bulk of the staff with rates of pay below 50s. a week is in the portering group (goods and passenger), goods loaders, permanent way staff, locomotive shed grades, carriage cleaners, and signal and telegraph labourers.

* * * *

The Week's Traffics

Fine weather contributed towards the increase of £168,000 in the passenger train takings last week of the four main line companies out of a total increase of £388,000 in comparison with the corresponding week in 1938. Total earnings of the four companies to date are £103,502,000, an increase of £2,252,000 or 2.22 per cent. on 1938. London Transport receipts for the seven weeks of the current financial year amount to £4,066,600, an advance of £166,400.

	33rd Week				Year to date	
	Pass.	&c. Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
L.M.S.R.	+ 72,000	+ 71,000	+ 19,000	+ 162,000	+ 850,000	+ 2.09
L.N.E.R.	+ 23,000	+ 54,000	+ 44,000	+ 121,000	+ 569,000	+ 1.93
G.W.R.	+ 29,000	+ 35,000	+ 3,000	+ 67,000	+ 674,000	+ 3.96
S.R.	+ 44,000	+ 1,000	+ 1,000	+ 46,000	+ 158,000	+ 1.14

Comparison of the 1939 traffics with those of 1937 is shown in the following table:—

	33rd Week				Year to date	
	Pass.	&c. Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
L.M.S.R.	+ 99,000	+ 9,000	+ 14,000	+ 122,000	+ 384,000	+ 0.92
L.N.E.R.	+ 25,000	+ 5,000	+ 14,000	+ 44,000	+ 452,000	+ 1.47
G.W.R.	+ 24,000	+ 4,000	+ 10,000	+ 38,000	+ 105,000	+ 0.60
S.R.	+ 47,000	+ 6,000	+ 1,000	+ 54,000	+ 61,000	+ 0.43

Traffics to date in 1939 show in comparison with 1937 decreases of £304,000 on the passenger side and of £919,000 in merchandise, but an increase of £553,000 in coal class receipts.

* * * *

Railway Returns for 1938

The railway returns for 1938 recently published by the Ministry of Transport show that on railways in Great Britain other than London Transport railways, passenger journeys, excluding those taken by holders of workmen's and season tickets, numbered 604,466,133, a decrease of 8.29 per cent., with receipts of £46,507,678, which were lower by £289,807 or 0.62 per cent. Workmen's ticket receipts, however, improved from £3,652,176 to £3,749,932, and season ticket receipts from £8,138,853 to £8,365,159. The proportion of journeys (other than those by holders of workmen's and season tickets) made with day or half-day excursion tickets was 69.59 per cent. in 1938, against 69.81 per cent. in 1937, with proportionate receipts of 30.86 per cent. and 31.79 per cent. In the case of monthly return and period tickets the proportion in numbers was 8.57 per cent. in 1938 against 8.21 per cent. in 1937, and the proportion in receipts rose from 41.08 per cent. in 1937 to 41.63 per cent. in 1938. Higher class merchandise receipts in 1938 amounted to £40,306,061, a decrease of £2,601,334 or 6.06 per cent.

Minerals and merchandise (Classes 1-6) produced receipts of £12,454,418, a fall of £2,601,393 or 17.28 per cent. The coal class receipts of £33,867,839 in 1938 were lower by £1,420,565 or 4.03 per cent.

* * * *

Overseas Railway Traffics

At this time a year ago the Buenos Ayres Great Southern showed a traffic improvement of £14,889 over the first eight weeks of the financial year 1937-38, and its latest figures are thus £52,295 below those of two years ago. The present aggregate increase of £23,761 on the Buenos Ayres Western goes against a decrease of £69,605 a year ago, and the corresponding gain of £179,705 on the Central Argentine contrasts with a fall of £304,005. Compared with two years ago the Buenos Ayres & Pacific shows a decrease of £60,049.

	No. of Weekly Week Traffics	Inc. or Decrease £	Aggregate Traffic £	Inc. or Decrease £
Buenos Ayres & Pacific	8th 74,442	+ 1,675	548,450	+ 10,297
Buenos Ayres Great Southern	8th 118,114	- 6,328	847,767	- 67,184
Buenos Ayres Western	8th 39,888	+ 4,590	301,117	+ 23,761
Central Argentine	8th 120,751	+ 17,758	941,145	+ 179,705
Canadian Pacific	32nd 524,800	+ 33,200	15,740,800	+ 262,600
Bombay, Baroda & Central India	19th 178,350	- 22,275	3,111,450	- 65,100

On the Canadian Pacific there has been an increase of £45,200 in gross earnings during the past fortnight.

* * * *

Smoke and the Railway

Favourable comment has appeared in the columns of leading daily journals published in Liverpool on the action taken by the L.M.S.R. to reduce the volume of smoke from the chimneys of locomotives in the neighbourhood of Lime Street station, and at other points within the boundaries of the city. Negotiations with the company, undertaken by the Liverpool Health Committee, were facilitated by a series of experiments carried out under the control of experts from the University in which a special automatic air filter was used to determine the degree of air pollution caused by the smoke. The decision reached by the L.M.S.R. after consideration had been given to the committee's report, was that of using Welsh smokeless coal in place of the grades previously employed, and this, it is believed, will contribute largely towards a cleaner atmosphere in the vicinity of the railway stations and depots. One of the journals in which the matter was referred to remarked that as far as the L.M.S.R. is concerned, the complaints would have no further justification and it was now up to the individual concerns as well as private residents to see that Liverpool's unfortunate fame as a smoky city was quickly dispelled.

* * * *

Railways of Siam (now Thailand)

There has been no important extension of the mileage of the Royal State Railways of Siam during the past two years, according to the Report on Economic and Commercial Conditions in Siam, just issued by the Department of Overseas Trade (H.M. Stationery Office, 1s. 3d. net). The total mileage, all of metre gauge, is 3,100 km. (1,926 miles). The system is divided into four main trunk lines, based on and radiating from Bangkok. The Southern line, after forking at Haad Yai, connects at Sungei Golok with the Federated Malay States Railways. A through express, with sleeping and restaurant accommodation, runs twice a week in 26 hours to and from Penang, while a temporary weekly express service between Bangkok has recently been added to cope with holiday traffic. The Northern line has its terminus at Chiangmai, whence there is communication by road with the Federated Shan States. The Eastern line runs to the Cambodian frontier, and the North-eastern line forks at Korat, whence one branch

goes east to Ubol, close to the frontier of French Laos and north to Khon Kaen, where it will be continued eventually to Nong Kai and Nakon Panom on the same frontier. The combined budget grants for railway construction for the two years ended March 31, 1939, amounted to 4,489,700 ticals, allocated as follows: Khon Kaen—Udon line, tcs. 2,818,348; remodelling Bangkok station, tcs. 787,252; doubling line to Ban Phaji, tcs. 586,500; modernisation of workshops, tcs. 551,900; Korat line, tcs. 105,700. The modernisation of the Makasan workshops is a new undertaking, the scheme for which will cost tcs. 5 millions and is expected to take five to six years to complete. Since June 24 of the present year, Siam has been known officially as Thailand.

* * * *

An Anglo-Scottish Fifth Birthday

Now that we have begun to reckon in centenaries, the fifth birthday of a long-distance transport service is an unusual event to commemorate. Last weekend was officially announced as the fifth birthday of the Railway Air Services Anglo-Scottish route, which was inaugurated on August 20, 1934. At that time the line ran *via* Birmingham and Manchester to the Isle of Man, Belfast, and Glasgow, but a year later Liverpool was substituted for Manchester as a calling place. This move had repercussions at the end of last year, when the company's application for a licence to continue working came before the newly-constituted air transport licensing authority. At the public hearing, the Manchester Chamber of Commerce opposed the application on the grounds that Manchester might be served direct instead of by connections from Liverpool, and that connections to the Continent should be improved. The intensified R.A.S. service of this summer was the reply, and Manchester now has four daily services each way to and from London, and two to and from Glasgow. Since its inauguration, aircraft on this route have flown two million miles, carrying 25,000 passengers and over 750 tons of mail and freight.

* * * *

Centenary of the Rhine Railway

After the separation of Belgium and Holland the former sought to improve the fortunes of Antwerp by connecting it with the Prussian Rhine provinces. Western German business circles favoured the plan, as it enabled them to circumvent the rather heavy dues then levied by Holland on transit traffic on the Rhine. Frederick William III of Prussia granted a concession in 1833 for a railway from Cologne to the Belgian frontier, but directly it was proposed to avoid Aachen, on account of engineering difficulties, a rival concern was started there. Opposition to any railway was offered by Rhine shipowners. The government settled the dispute between the rival concerns in February, 1837, by ordering the original Rhine Railway Company of Cologne to make the line through Aachen. Work was delayed until April, 1838, and then it was pushed forward day and night and eventually also on Sundays, for which the Archbishop of Cologne accorded special permission! The first section, the 7.5 km. (4.6 miles) between Cologne and Mungersdorf, was opened on August 2, 1839. The first three locomotives came from Longridge in England; Stephenson's price was considered too high and an engine built in Aachen proved a failure.

* * * *

Passengers' Luggage in Advance

An official described the recent search over the railway systems for the two missing vans of luggage for Scarborough as comparable to looking for a needle in a haystack, with the added complication that the "needle"

kept moving. He was not exaggerating the scope and magnitude of the search, says the railway company, when it is remembered that the L.N.E.R. owns more than 39,000 covered vans and over 16,700 miles of line, including sidings. On the L.N.E.R. alone 6,680,000 journeys have already been made by loaded wagons this year, but the chances of a wagon going astray in transit are 1 in 100,000. The chances that the particular wagon concerned should contain passengers' luggage are infinitesimal, since such traffic is normally despatched in luggage vans of passenger trains, or in special vehicles of which an individual daily census is taken all over the system. At very busy holiday times, however, use is made of express freight trains to despatch full truck loads of parcels traffic or passengers' luggage between large stations, thus relieving ordinary passenger trains and avoiding handling at intermediate stations. It can be said, therefore, that the odds against a passenger's luggage in advance failing to reach its destination are several millions to one. If, however, the passenger is still apprehensive, means of insuring his luggage against damage or loss at a very low premium can be explained to him at any booking office or station.

* * * *

Building or Rebuilding?

For a number of years past there has been very little new locomotive construction in France. In part this fact is explicable by the widespread introduction of railcars, and in part, also, by the extension of electrification, in particular in the South-Western Region of the S.N.C.F., which has entailed displacement of steam locomotive stock. But the main explanation, at least so far as concerns main lines and the principal subsidiary lines, is the extensive locomotive reconditioning which has taken place in France, whereby many of the older locomotives have been brought up to the latest modern standards of efficiency, and at the same time have had their haulage capacity materially increased, at a cost but a fraction of that of building new engines. Credit for setting the ball rolling must go to the late Paris-Orleans Railway, where the researches of M. André Chapelon resulted in the 4-6-2 and 4-8-0 conversions which have had so strong an influence on subsequent French locomotive practice. On page 281 we describe how some smaller 4-6-0 locomotives of the late State system, now the Western Region, have been similarly transformed, with a success that may be judged by the details of their performances given in the same article. Details are also set out of the work of some of the 125 5-ft. 9-in. 4-6-0's of the Northern Region, which, though weighing only 68 tons, are capable of an indicated horsepower output of 2,000, since fitting with the Lemaître multiple-jet exhaust. The possibilities of similar reconditioning of earlier British locomotive types still in service is an economic suggestion that arises.

* * * *

The Fully Automatic Gravity Yard

Notwithstanding the good results obtained in gravity yard working by the various rail and other brake systems, controlled by operators, who use their judgment in retarding the running of this or that vehicle, there have not been wanting proposals for the construction of apparatus which should be practically independent of any such discretionary action. We reviewed in our issue of August 21, 1936, a very interesting contribution to this problem made by an officer of the former Est lines in France, Monsieur Rabourdin, who foreshadowed the introduction of apparatus on the above lines. In the *Revue Générale des Chemins de fer* for June last Monsieur Vinot describes the actual installations now in use at Blainville and Vaires, in which

the principle of full automaticity has been realised. The extremely ingenious equipment is based on the employment of motor-controlled brake shoe devices, placed in series along the lines concerned, with telephone type switch mechanism and treadle rail-contacts arranged to detect the running features of each vehicle and modify the action of the brake shoes accordingly, taking account of the running of vehicles ahead and in rear and the amount of free space in the siding into which any particular one is being directed. The apparatus is stated to have answered expectations and to form a distinct advance on anything so far achieved. It is indeed claimed that it is possible with it to operate a hump yard in total darkness or dense fog.

* * * *

Fabricated Locomotive Cylinders

An article in a recent issue of the *Organ für die Fortschritte des Eisenbahnwesens*, by Herr M. Reiter, gives details of the process of fabricating locomotive cylinder and valve chest units out of standard boiler plate material, with which experiments have been made in view of the difficulties experienced in repairing defects in the ordinary cast-iron type, especially with inside cylinders. Electric arc welding is used and the completed unit is stress-relieved by furnace treatment. Trials made on two separate locomotives with one fabricated unit on each gave very satisfactory results for outside cylinders; an inside cylinder unit was then made and applied to an express engine, which has run some 25,000 miles without mishap. The results have been so encouraging that Herr Reiter considers that fabricated units will probably be extensively adopted for inside cylinders, which are more subject to damage and more difficult of access for inspection and repair, while cast iron will be retained for outside cylinders. The first cost of fabricated units is necessarily considerable, but the advantages obtained in service should make their use profitable. In this country, cylinders for an L.M.S.R. 2-6-4 tank locomotive have been fabricated by welding at Derby works, as described in our issue of May 18, 1934, while some similar French experiments have also been the subject of articles in our pages, notably in our August 5, 1938, issue.

* * * *

Strangers within the Barriers

Involved situations on the Continent invariably have repercussions in our metropolis, and a recent one has been the abnormal influx of persons equipped with little vocabulary and still less geography, but bravely undertaking journeys on the far-flung Underground. Many poignant cases of misadventure have come to our notice, and we felt particularly sorry for one foreign gentleman, who, we gathered after twenty minutes' difficult dialogue, had changed six times and was still more or less where he started; only our innate tact on this occasion prevented us from exclaiming *plus ça change, plus c'est la même chose*, and doubtless other tales could be told of those seeking Morden and finding Ealing Common, or of pilgrims from Paddington unwittingly making three "full circles" before attaining Edgware Road. This "wander-mania," moreover, is equally rife amongst our fellow-countrymen, and it is no exaggeration to state that twice or three times daily on an average we find ourselves in the Gilbertian position of masters undergoing *viva voce* examinations from pupils whose bump of locality is, to put it mildly, no more than a pimple. Measures have long been adopted to reduce the numbers of those who err and stray from their ways, and it is rather sad that travellers in doubt, whether they be imported or indigenous, do not drink more deeply at the information founts, officially established for their guidance and education.

Railway Warehouses

WAREHOUSE accommodation is an essential part of the equipment of transport undertakings of any magnitude, and it is not surprising, therefore, that the British railways should have found it necessary to expend substantial sums on the provision of commodious warehouses. At the present time they have well-equipped premises available for the storage of goods at all the principal railway distributing centres and docks throughout the country. These railway warehouses rank A1 with insurance corporations, who quote favourable rates in respect of the merchandise stored in them. At many of the places wet and dry bonds and Customs accommodation are available, and expenditure is continually being incurred on the modernisation and enlargement, as well as on the construction of additional warehouse premises. Modern retail trading methods require the rapid turnover of the smallest possible stocks, a system which makes it essential that supplies should be replenished with frequency and reliability. Holding bulk supplies at or near the principal consuming centres is undoubtedly the best method of meeting the requirements of traders, and railway warehousing facilities are being used increasingly for this purpose.

Railway buildings afford ideal facilities for the storage of many classes of merchandise at exceptionally low rentals, which range from about 5s. 6d. a square yard per annum in the provinces, with a minimum of 20 square yards, to a slightly higher figure in the metropolis. Short period tenancies are also arranged on a weekly rental basis when desired. Sections of railway warehouses can be enclosed and reserved for the use of a particular trader or, where a firm's business is so extensive that the traffic cannot be accommodated conveniently in the local railway warehouse, arrangements are frequently made by the company concerned for the erection of a building on railway property for the exclusive use of the firm concerned. By the use of railway warehouse facilities, goods can be forwarded in bulk by the supplier and distributed in detail to customers as and when required, upon receipt of telephone orders. The forwarding of goods in bulk instead of small consignments frequently represents a saving of time and money to the supplier, while the local retailers' requirements can be met with the promptitude and reliability which their trade demands, at a very low cost. When the goods reach the railway warehouse, the trader can use his own staff to execute the orders or can avail himself of the services of the railway company, which undertakes the necessary labourage services at very reasonable rates. The company frequently carries out many incidental services, such as sorting, weighing, sampling, labelling, and decanting, and will maintain a complete record of the business on the trader's own stock sheets.

Numbers of firms are also availing themselves of the facility whereby the companies undertake the sale of the goods on behalf of the traders up to a value of £40 on a small commission basis. In recent years considerable attention has been devoted by the railway companies to the greater use of land owned by them adjacent to stations, and many uncovered spaces are now let to traders at very low annual rentals for the storage of such commodities as pipes, gravel, bricks, and other building material. Office accommodation can often be provided, if desired, or alternatively the companies will take charge of the stocks and distribute the materials in a similar way to that adopted in respect of goods in covered warehouses. The use of these storage facilities generally, when combined with the wide range of delivery services

afforded by the companies, including railhead distribution and country lorry services, enables traders, in effect, to establish branch sales depôts in proximity to their principal customers' stores with the minimum of expense.

* * * *

Tanganyika Railways and Ports

THE railway system worked by the Government of Tanganyika Territory, of which we have received the annual report from Mr. R. E. Robins, the General Manager, consists of two separate sections, both of metre gauge, with no physical connection between them. The Central line, 775 miles in length, runs from the port of Dar es Salaam inland to Lake Tanganyika, with two branches, one to Lake Victoria (235½ miles) and the other to Kinyangiri (93½ miles). The Northern line, 272 miles in length, runs inland from Tanga, on the coast, to Moshi, and connects with the Kenya & Uganda Railway at Kahe. The total length of the whole system is 1,376 miles. The line reaches heights of over 5,000 ft. above sea level, and severe gradients are a frequent condition of working in the interior. Ports and wharves on the coast and lakes are under the same administration as the railway, as well as the steamer services on Lake Tanganyika. The revenues of the railways suffered a severe setback in 1938. Net earnings failed to cover debt charges by £20,780 and during the year it was necessary to borrow £15,000 from the Territory's funds to meet the deficit. The setback was due to adverse weather conditions, general depression, political uncertainty, and to the infiltration of traffic carried by the Kenya & Uganda Railway. The principal results of operating compare with those of 1937 as follows; the figures relate only to railway working except where otherwise stated:—

	1937	1938
Mileage open	1,376	1,376
Passengers	460,730	499,603
Goods, metric tons, revenue ..	274,611	233,154
Ton-miles	63,909,943	44,167,822
Train miles	788,921	646,006
Operating ratio, all services, per cent.	49.31	56.40
Coaching revenue	119,339	117,536
Goods and livestock	557,501	443,373
Gross receipts, all services ..	780,565	662,556
Expenditure, all services ..	384,913	373,660
Net earnings, all services ..	395,652	288,896
Debt charges, all services ..	312,454	309,676
Net surplus	83,198	
Net deficit		20,780

The gross earnings of the railways only, accounted for £576,755, against £698,205 in 1937, and railway expenses amounted to £337,695, compared with £337,663 in the previous year. The principal feature of the fall in traffic receipts was in ground nuts, the crop being a failure due to climatic conditions, causing a reduction in tonnage from over 20,000 tons in 1937 to 2,783 tons in 1938. This alone accounted for a drop of £37,000 in receipts, apart from indirect losses in resultant imports. The number of passengers was 8.44 per cent. higher, but corresponding receipts were only slightly better, the average fare having fallen. There was again an appreciable increase in the number of passengers carried in the Sentinel railcars, and 132,818 km. were run by these cars, against 130,592 in 1937. In the locomotive department the most noteworthy item was the rise of 66.5 per cent. in the price of coal, which led to the use of wood fuel. A Railway Renewals Reserve Fund has been formed and the Territory will set aside a fixed annual amount of £50,000 for this purpose. The total estimated capital cost of the system is £9,962,141, and on this figure the net earnings represent a return of 2.90 per cent.

In his remarks at the end of the report the General Manager refers again to the diversion of traffic due to the lower standard of rates in force on the Kenya & Uganda Railway, a diversion which is calculated to have represented a loss of some £20,000 to the Tanganyika administration in 1938. Legislation has now been introduced to control the movement of the diverted traffic by waterway. As regards road competition, this problem exists in Tanganyika as in other countries. The Ordinance of 1937, which is on similar lines to the regulations in force in Kenya & Uganda, is calculated to control abuses, but unfortunately difficulties arose and the Ordinance has never been applied. Finally, the setback of 1938 is believed to be but temporary, and with favourable conditions and a return of confidence, there is every reason to believe the railway will overcome its financial difficulties.

* * * *

Smoke Prevention on Railways

NUMEROUS and varied projects have from time to time been advanced for dealing with the problem of smoke prevention on railways, and designers of steam locomotives have, especially in later years, done much to aid in combating what is universally regarded as one of the greatest evils of railway operation. Such devices as smoke "burners" or "consumers" are foredoomed to failure because smoke once produced cannot be consumed, at least not under locomotive boiler conditions, and the only really effective way of overcoming the difficulty is to ensure more thorough combustion of the fuel. Restrictive legislation has played its part in bringing about improvement, and in this respect the regulations enforced in the United States are perhaps the most stringent of any. The subject is one of increasing importance to railway administrations wherever coal-burning locomotives are used, which is another way of saving on the vast majority of railways. We have read with interest the paper on smoke abatement presented at a recent meeting of the Smoke Prevention Association at Milwaukee by Mr. John Bjorkholm, Assistant Superintendent of Motive Power, Chicago, Milwaukee, St. Paul & Pacific Railroad. He emphasised the importance of educating the firemen in the performance of their work, as carelessness in this respect often results in the creation of undue smoke, which can be avoided by skilful control of the fire. He next referred to the preparation of coal at the source, a matter that has been recognised as highly important and should therefore be given proper attention.

At the present time the American railways are insisting upon careful preparation of coal at the mines and they usually maintain permanent inspectors there whose duty it is to examine the coal prior to despatch to see that it is reasonably free from dirt and impurities. Proper grading of the coal is also a very important point, because a mixture of extremely coarse coal and too much fine results in erratic firing and heavy smoke. A high firebox temperature is one of the major factors aiding smoke elimination, and such temperatures can be obtained only with coal of a reasonably good quality and suitably prepared. This is more particularly the case where engines cover a large mileage and remain in service for long periods at a time, in which conditions the fire has a tendency to become heavy. Another aspect of the matter is that of running-shed conditions. Some railways have erected costly and elaborate plants to overcome complaints from the authorities, and considerable attention is also being given to the firing-up process with existing facilities. In the past one of the difficult problems in connection with locomotive firing was dirty tubes and tubeplates, the soot

adhering to the firebox plates constituting a very efficient heat-insulator. As a result fires had to be forced to a greater extent than is necessary with clean heating surfaces. It must be remembered that the more coal burned per sq. ft. of grate area per hr. the more smoke will of necessity be the result. One remedy is to use soot-blowers which can be operated while the locomotives are in service, thus keeping the heating surfaces comparatively clean.

In summing up, the author of the paper said he did not wish to leave the impression that coal-burning locomotives could be operated without smoke. As everyone versed in the subject knows, there are times when, due to certain operating conditions, there is bound to be smoke and sometimes a lot of it coming from the chimney of a locomotive, as, for instance, when the driver, perhaps unexpectedly, must close the regulator after having worked the engine at full capacity for some time; or when starting out with the firebox at a comparatively low temperature and having to work on a somewhat tight scheduled timing. Under such conditions the avoidance of smoke emission can be only partial, but even so if the fireman is on the alert and has at his disposal the proper equipment much more satisfactory results can be obtained and the principle of smoke abatement correspondingly advanced.

* * * *

America's Abandoned Railroads

ALTHOUGH the abandonment of unprofitable United States railroads has been known to be in progress on a fairly wide scale ever since the war, it is perhaps scarcely realised in many quarters that the total American route mileage torn up or left to rust during the past twenty years is practically equal to the total route mileage now operated by the four British main line systems. The British route mileage at the end of 1938 was 19,131 miles, whilst American lines abandoned during the period 1917-1937 accounted for 19,072 route miles of track. The magnitude of this American social as well as purely railway problem is brought home by an authoritative survey recently published in the United States ("Big Abandoned Railroads," by W. B. Schallek, in the May, 1939, Bulletin of the Railway & Locomotive Historical Society). The main factors which have brought about the progressive retrogression of U.S.A. mileage since 1917 are, of course, well known, namely, the financial collapse of systems built up under boom conditions, particularly in the midwest; exhaustion of natural resources of timber and minerals in some regions; and, the largest factor of all, rising railroad costs and intensive highway competition.

Mr. Schallek's survey, however, brings out a number of interesting and not well-known points. There are, for instance, at least a dozen complete U.S.A. railroad systems over 100 miles in length which have been abandoned entirely, and 46 of over 50 miles in length—omitting altogether interurban electric lines. It is also significant that the total mileage abandoned during the 1917-1937 period is greater than that of the six New England States, of New York, and a good third of Pennsylvania. The largest of all America's abandoned railroads is (or was) the picturesque and romantic Colorado Midland (338 miles), closure of which dates from 1918. Although considered among the finest scenic lines in America, it was built originally to serve mining regions, but later became part of a transcontinental route; it crossed the Continental Divide at an altitude of over 10,000 ft. by means of a tunnel two miles long. Running the Colorado Midland close for length of abandoned road is the Denver, South Park & Pacific RR. (328 miles of 3-ft. gauge), whose initials were said by sarcastic railroadmen to stand for "Damned Slow Pulling & Pretty Rough Riding."

Through this sorry recital of abandonment in a country where railroads are being increasingly regarded, in some quarters at least, as essential only for trunk and heavy-residential traffics, there runs that thread of romance—and now of pathos—that is inseparable from the birth, life, and death of railroads in the less inhabited parts of the Americas. There are curiosities, too, as witness the now abandoned Cincinnati, Georgetown & Portsmouth RR. (69 miles) which at one time had three different gauges (3 ft., 4 ft. 8½ in., and 5 ft. 2½ in.) all in operation at the same time. The sad distinction of being the shortest-lived railroad in America is claimed for the Colorado,

Kansas & Oklahoma, opened in 1911 and abandoned six years later. The Findlay, Fort Wayne & Western (91 miles) was known as the "Tangent Line," supposedly having not a single curve. Another defunct system at one time bore the official title, later to prove rather a grim joke, of The Bright Hope Railway! Leavenworth, Kansas, is "served" by four railroads, all abandoned, whilst a railway "ghost town" which once had three railways and now has none is Rhyolite, a spot in the middle of the desert where the Las Vegas & Tonopah, the Bullfrog-Goldfield, and the Tonopah & Tidewater RR.—all now defunct—formed a large union station.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Edinburgh Contrasts

5, Bristo Place,

Edinburgh, August 14, 1939

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The illustrations of "Edinburgh Contrasts" in your issue of August 11 are extremely interesting to me as I have a very distinct recollection of the old North British Railway offices which were approached through a "pend" at the east end of Princes Street and then down a steep declivity to the precincts of the station, all now covered up by the hotel.

At that time I had a good deal to do with transfers of railway stock—I think Walker was the name of the General Manager then—and a good deal of speculation went on in the stocks of the line. That was about fifty years ago and most of Edinburgh has changed nearly as much as the portion shown in your two illustrations.

Yours faithfully,

GEO. BRODIE

[We take the opportunity to offer our apologies to Mr. Norman D. Macdonald for two errors committed in condensing the notes he so kindly sent us descriptive of the pictures. Fortunately the errors would be apparent to anyone acquainted with the scene shown, for it was obviously not a part of the Haymarket station which could be seen in the picture taken 50 years ago, Haymarket being over a mile distant. What Mr. Macdonald wrote meant that on the north side of the present Haymarket station may still be seen remains of the very small shed of the original Edinburgh and Glasgow Railway terminus. Nor are the Princes Street Gardens above the Waverley Market, but beyond it, and it was the ornamental gardens laid out on the roof of the Waverley Market, on the level of Princes Street, which Mr. Macdonald's father, the Right Honourable Sir J. H. A. Macdonald, G.C.B., LL.D., F.R.S., the late Lord Justice-Clerk of Scotland, first suggested in the *Scotsman*.—ED. R.G.]

Enterprise at Cambridge

Peterhouse, Cambridge,

August 21, 1939

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Perusal of your paragraph on page 163 of the issue for August 4 prompts me to take up the pen in self defence. I feel that if an inadequate reply were not made the authorities of the university might descend upon us and curtail our activities on the grounds that not enough time has been devoted to our studies and too much to L.N.E.R. buffet cars and the wanderings of its lines in East Anglia. If this were to happen we would of course subpoena the company on our behalf in view of the help we have given to its dividends (?).

It is on record that certain members of this club have travelled from Cambridge to Hitchin by the 10.10 p.m. buffet car express and returned by the 11.40 p.m. train from

Hitchin to Cambridge where they were landed at the late hour of 1 a.m. Considerable quantities of malt liquor were consumed on these occasions. As an antithesis to these nocturnal journeys we have left Cambridge very early in the morning fortified by some excellent breakfast baskets, relics from the G.E.R., supplied by the Stationmaster at Cambridge. Certain members of the club consider themselves connoisseurs in the matter of railway refreshment, as on our recent tour of Scotland we had many opportunities of sampling the well-known ham sandwich and the Standard L.M.S. Dinner.

Whilst perhaps these doings do not attain the standard of our *vis-à-vis* or the magnificent journey described in your article they do show that at any rate no time is wasted at Cambridge in improving our acquaintance with the Catering Department of the L.N.E.R.

Yours faithfully,

J. M. BLAND,
Hon. Sec., C.U.R.C.

"The First Course"

56, St. Mary's Mansions, Paddington, W.2

August 19

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—May I point out that *hors d'œuvre* were actually served in the 2s. 6d. lunch on certain Great Northern cars in pre-war days. I first encountered them on the 2 p.m. from Leeds in August, 1908!

With regard to Mr. Squarry's letter, in your August 18 issue, dessert—another "Continental" speciality—was originally served in the Pullman lunch (at any rate on the L.N.E.R. Pullman services), though of course passengers are entitled to expect certain additions to the railway companies' menu in view of the extra Pullman meal charge. And the credit for the general inclusion of melon or grape fruit, as an alternative to soup, undoubtedly belongs to the L.N.E.R.

Yours faithfully,

R. E. CHARLEWOOD

Newlands, Moor Park, Northwood

August 19

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I notice that you have commented, with agreement, on my recent letter to the *Sunday Times* on menus, and being the only comment I have heard of, I have looked it up.

I would certainly extend my criticisms and observations to railway restaurant cars. Chefs and stewards do wonders in a limited space, but they want to use a little more imagination and it might save trouble in the end. It might mean a little more work in the station kitchen, but less on the train.

It may not be easy to serve *hors d'œuvre* on a train, and some passengers would not know what was meant by it, but many of us would much rather have them, even limited to say four varieties, than soup. Soup only blunts the

appetite. Soup should only be served at dinner, as in France, and then in bowls, not soup plates, and so be kept hot while eating. The consommé often served in restaurant cars is not worth the trouble of preparation.

The difficulty of change is to get people used to it. If you serve what I call a Continental lunch in a restaurant car—i.e., *hors d'œuvre*, omelet or some kind of fish, cold meat and salad or a cutlet, fruit and cheese (or a cold sweet)—you would please half the passengers; the other half would grumble at not getting what they expected. A friend of mine who is a Continental traveller has told me that there is no comparison between the meals served on French trains and English trains. Those served in England are often far from appetising; there is for instance a fish called "brill," the entire catch of which appears to be reserved for railway restaurants and cars—one never sees it anywhere else and no one would eat it if they did.

Let the heads of the railway catering staff take as their model not so much the hotel *table d'hôte* meal, as the menu of the modern snack bar, such as the excellent one at Paddington station. Have you ever seen potato salad served on a train? I haven't. As to salad generally. When hotel, restaurant or railway caterers put salad on the menu let them serve a proper salad, and not as is so often done, the raw materials of salad, such as lettuce, radishes, &c.

If food on trains is in need of improvement, as I think it is, this is also the case, only much more so, as regards the catering on some of the cross-Channel steamers. I crossed from Southampton to St. Malo last summer and supped off cold ham and bottled beer. The food would make the average foreigner turn pale. As to the coffee provided on board—well, there, I have nothing in my vocabulary to describe it, it's like nothing else on earth. On the other hand I have always found the teas with accompaniments, the coffee and cheese and biscuits provided on restaurant cars, the best of their kind. The catering on our lines is now very uniform, and I cannot say it is better on one than another. But my experience has been mainly on the G.W.R. and Southern Railway.

Yours faithfully,

H. LANGFORD LEWIS

[Our correspondent asks if we have ever seen potato salad served on a train. Yes, regularly at luncheon in the summer on the Southern Railway, with an excellent selection of cold meats, veal and ham pie, &c.—ED. R.G.]

Safe Speeds on Curves

Tile House, 8, Comiston Rise,
Edinburgh, 10, August 14

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—If you cannot tolerate my returning to an old subject, I shall not quarrel with you but my excuse is an article in your issue of August 11. It is true that it deals with doings on the Santa Fe Railroad, but it reflects ideas that are not unheard of over here. There is much in it to provoke remark, but to avoid being too discursive I take from it the following phrase only, "*on the principle that any speed giving comfortable riding is lower than the safe and much lower than the overturning speed.*" With your indulgence I should like to try to analyse this, merely adding, for the benefit of those who may have overlooked the article, that its tenor was the correctness of basing permissible speed on the amount of the cant.

We note first that overturning speed is out of the picture and few will be found to dispute that. Now one of the principal factors governing overturning is the cant, and if overturning is out of court, does not cant go with it? The only reply I can conceive is, that cant cannot be dismissed because it governs not only the overturning but also the safe speed. With this we cannot agree or disagree unless the safe speed is defined and that, not by merely writing down "*speed equals K times E (the cant) minus n,*" for that begs the question, unless it can be shown to be based on some established physical law. A broad definition would be that the safe speed is some proportion of the speed at which collapse takes place, just as the working strength of steel is some proportion of the stress at which the steel

breaks. But this does not take us far without defining the collapsing or critical speed.

In order to approach this aspect of the problem we must adopt the usual process in all such matters and enquire what are the phenomena of collapse when it occurs. I suggest that there are few, whether on this or that side of the controversy, who would deny that, given a soundly constructed track, the phenomenon of collapse is the lifting of the outer wheel flange clear of the rail. What influence has cant, then, on this phenomenon? I again suggest that few would deny that the greater the cant the more easily the wheel will lift, owing to the transference of a greater proportion of the downward load to the opposite, that is the inner, end of the axle. Here then is the connection we are seeking, and it amounts to this that, other things being equal, the higher the cant the lower the critical and therefore the safe speed.

Is this the principle which your contributor invokes? I doubt it. I go further and suggest that the expression "principle," so often heard in this connection, is used either carelessly or in order to cover with an impressive word a lack of any fundamental ideas whatever. Seldom do the advocates of this line of action attempt to justify the so called theories on which they choose to rely. In those few cases where they do, the justification consists in lifting a mathematical expression out of a text book and manipulating it to give a converse solution. In so doing they assume, without proof, firstly that the formula is applicable, secondly, that it embodies all the material facts, and thirdly, that since a big dog requires a big kennel, therefore, given a big kennel, you cannot put a small dog in it.

Nor is this a matter of academic significance only. I am convinced it has permeated and demoralised British practice for generations. That it is not doing so to quite the same extent today is due to the ingenuity of one or two engineers, here and abroad, who have devised a technique which has secured a large measure of adoption, more, I suspect, by reason of its convenience than by any appreciation of the sound principles on which it is based.

Yours faithfully,

REGINALD PETERS

[Cant has an influence on passenger comfort which must be one of the main limiting factors to be considered in deciding speeds on curves. As the article referred to implied, overturning cannot become a risk if this principle is observed, though it must be admitted that the term "safe speed" there used is vague enough to merit our correspondent's strictures. We are not sorry, however, to have given Mr. Peters a peg.—ED. R.G.]

Kearney Tubes as Air Raid Shelters

London, July 21

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The author of the article on "Kearney Tubes as Air Raid Shelters" in your issue of July 14, went fully into the question of the capacity of such tubes to accommodate great numbers of people, in which respect, indeed, they seem to have special advantages. He did not, however, appear to give adequate attention to the two fundamental questions that arise in regard to air raid shelter propositions, namely, the questions of *protection* and *access*. Since a perusal of the article may lead public authorities to take an unduly optimistic view of the value of such tubes as a solution of the shelter problem, I venture to hope that you will find space for these observations on the subject. They are not merely a personal view, but are based on the application of the conclusions reached last April by the Hailey Conference after a careful review of the available data. This conference, which was presided over by Lord Hailey, was set up by the Lord Privy Seal to consider and advise on the shelter problem, with particular reference to the provision of "heavily protected" shelters. It consisted of a number of leading people in various spheres of the national life, including an eminent engineer and a distinguished scientist. Its report was unanimous.

Protection.—"A shelter which relies on depth alone for protection should be some 60 to 80 ft. below ground, accord-

ing to the nature of the soil. A shelter which relies on reinforced concrete should be covered by (i) a shield or canopy of 3 ft. or more of concrete; (ii) below that a substantial expansion chamber of air, or of some medium such as sand; and (iii) below that again a concrete roof of at least 2 ft. 6 in. in thickness, preferably supported by a steel lining. At the same time, since impact is liable to be at an angle of from 17 deg. to 30 deg. or more, the upper canopy must, in the absence of adequate lateral protection, overlap the shelter by an amount varying with the depth of the latter." (Hailey Report, paragraph 20).

Depth will protect the sections of the proposed tubes which are 60 to 80 ft., or more, below ground; and the design shown for the actual stations suggests that these would be adequately protected by "canopy." But what about the considerable intermediate sections, where the tube is descending on a 1 in 7 ramp from ground level to 60 or 80 ft. down? These also would need to be "canopied."

It is obvious that a large shelter, holding a great concentration of people, cannot afford to have any weak spot. "Should the protection afforded fail" at any point, "... a single bomb might wipe out the whole of the occupants of a shelter" (Hailey Report, paragraph 35). This is a notably serious risk in the case of the tubular shelter.

Access.—The estimates given (on the basis of a double tube) of the usefulness and cost of the project assume an accommodation of 50,000 persons per route-mile. Now, the speed of access is governed by the width (apparently 6 ft.)

of the floor-space at the entrance to each tunnel. This provides, at each station, a total entrance width of 24 ft., into the tunnels themselves. But the results of observation and experiment show that, "in providing accesses to an air raid shelter, it would seem unsafe to allow for more than about 20 persons entering per minute through each foot of width of entrance" (Hailey Report, paragraph 28). This means that not more than 500 persons per minute could be admitted into the tubes from each station.

The interval between the warning signal and the moment when bombs may actually begin to fall will be seven minutes; and it is not to be expected that the crowds converging on the entrances will arrive in uniform numbers throughout this period (see Hailey Report, paragraphs 14 and 24). To take 5 min. as the effective period of admission would be a very favourable estimate. This would permit of the admission of not more than 2,500 persons per station. Thus the figure of 50,000 persons per route-mile would require 20 stations per route-mile. With a normal provision of, perhaps, a station every half-mile, the shelter would be available only to some 5,000 persons per route-mile; and the cost per person would be ten times as great as it would be if regard were had (as in the article) merely to the numbers who could be physically accommodated in the tubes, without regard to the question whether they could secure access in the time available.

Yours obediently,

A STUDENT OF A.R.P.

RAILWAY WAGES

(By an agricultural correspondent)

The daily papers record today, August 17, that the claim of the Associated Society of Locomotive Engineers & Firemen was rejected by the railway managers, and that the men's committee has gone into the country to continue its campaign, with the threat of a strike action in the foreground. Time was when the threat of even a sectional railway strike caused much public excitement. That time has gone—thanks to the experience of 1926 and subsequent development of road transport. Moreover, the drivers and firemen (who are not engineers in any respect) do not improve their case—if case they have, by threatening to strike. There are some members of the public who remember certain action of the kind by the same class of men during the war.

But it is not so much the case of the drivers and firemen that affects the country as the present attitude of the railway managers and directors. *The Times* states: "Indeed there is a feeling among the management that if they could afford to make concessions at this time, a raising of the minimum wage would be the fairest course"—this on the top of the recent raising of the minimum wage to 45s. a week! Time was, again to use that expression, when the railway management knew something of conditions other than in towns. Railways passed through the country from Land's End to John O'Groats. Many railwaymen live in hamlets and villages a mile or two from the station. Many others are at small places where the only local industry is

agriculture. It has always been held that railway companies should pay wages somewhat higher than are paid to agricultural labourers in spite of the fact that the degree of skill required from, say, a railway platelayer and a farm labourer is greater in the case of the latter. Proof is that any farm labourer can become a platelayer.

The management seems now to have gone from the sublime to the ridiculous. The lowest paid railwayman is now to get 45s. a week, whereas, from August 1, the agreed minima for male agricultural workers 21 years of age and over, fixed under the procedure of the Agricultural Wages (Regulation) Act, 1924, are as shown in the accompanying table.

Have the railway managers considered the effect of their action on wage rates throughout the country—the North of Scotland and other remote parts of the country? No one objects to payment of adequate wages, even high wages, provided the industry concerned can bear them. Presumably the railway management feels it can bear a 45s. minimum, although there are thousands of poor stockholders, who are more in need of a dividend, no matter how small, than many railway employees. Railway dividends appear to be the last consideration of the "management." But there are other considerations. If a country platelayer or a porter is worth 45s. a week, what is a busy signaller or shunter, or goods checker worth?

The range of payment from the minimum entrance figure to the maximum of the highest paid workers is becoming dangerously reduced and the management which favours the raising of minimum rates will find it has made a rod for its own back when the rates for the more responsible men (not drivers and firemen) have to be dealt with.

One other point, does the public know that the army of porters to be seen at all large railway stations who accept, nay demand, good tips for small services, get a minimum of 45s. a week, plus clothing, plus privileges, plus higher wages for overtime and Sunday duty, and in many cases pension provision. A porter at Euston, Waterloo or Paddington, must have a bad week if he does not net over £5.

British agriculture is in a parlous condition: prices are low, wages already are much higher than before the war. If the action of the railway management leads to the logical result of causing agricultural workers' wages to be advanced, then the companies may find that their rural traffic will further diminish.

CURRENT MINIMUM AGRICULTURAL WAGES

		Wages s. d.	Hours	
			Summer	Winter
Berkshire .. ..	..	33 6	50	50
Cambridgeshire ..	..	35 0	50	48
Cumberland .. ..	..	35 6	54	—
	..	34 0	—	48
Devonshire .. ..	..	35 6	52	50
Dorset .. ..	..	34 0	51	48
Essex .. ..	..	34 6	50	48
Gloucester .. ..	..	34 0	50	48
Kent .. ..	..	35 0	52	48
Middlesex .. ..	..	38 6½	50	—
	..	37 0	—	48
Oxfordshire .. ..	..	35 0	50	48
Wiltshire .. ..	..	34 6	50	50
Carmarthenshire ..	..	33 0	54	51
Pembroke .. ..	..	33 0	53	54

PUBLICATIONS RECEIVED

London Adventure. By Elizabeth Montizambert. London: Passenger Transport Board, 55, Broadway, Westminster, S.W.1. 6½ in. × 4½ in. 84 pp. Illustrated. Price 6d. net.—We are, until faced with the persistent "Why?" of a small boy, rather inclined to take for granted the achievements of England's famous people. In "London Adventure," Miss Montizambert, author of "Unnoticed London" and "Michael's London," puts Michael, Peter and Janet, three very inquisitive young people, on the trail of historic figures or, rather, places associated with them, and, in addition, sends them on a tour abroad without the need for leaving London. The celebrities tracked down by the three youngsters include General Wolfe, Michael Faraday, and Queen Elizabeth. This entailed visiting most of London's show places, but the result of their investigations, summed up by Miss Montizambert, have been worth while. The chase is necessarily a long one. Wolfe, for example, is associated with 11 museums, churches and parks, while Good Queen Bess is tracked over no fewer than 26. This makes an excellent companion to "London Craftsman" and one that should prove popular in the "London-in-your-Pocket" series.

E.Q.A. (Engineering Questions and Answers). Vol. II. London: Emmott & Co. Ltd., *Mechanical World* Offices, 28, Bedford Street, W.C.2. Manchester 3: 31, King Street West. 9½ in. × 7½ in. 176 pp. Illustrated. Price 6s. net.—As we stated in our review of Volume I of this publication, which appeared on page 135 of *THE RAILWAY GAZETTE* for July 24, 1936, the "Questions and Answers" section of the *Mechanical World* has been a feature of that paper for many years, and it is no exaggeration to say it is known to engineers the world over. Frequent requests were made that the answers should be published in book form, and the outcome of this was the first volume of "E.Q. and A.," which contains a selection of answers appearing in the *Mechanical World* in 1934 and 1935. The publishers state that the reception accorded to Volume I has led to the appearance of Volume II, the present book, which contains the answers published from 1936 to 1938.

The value of the collection lies in the fact that the questions all arose originally out of difficulties and problems encountered by engineers in the course of their work, and it is thought that the continuance of the record in a convenient form for reference will be of real service. A perusal of Volume II leads us to support this suggestion, as the subject matter covers a very wide field of interest to engineers engaged in many different classes of work, and including matters of interest to railway engineers and mechanics. The system adopted is that of setting out the question in abbreviated form and following this

by an answer containing the necessary detail, and, although conciseness is one of the good points of the volume, nothing is sacrificed to a desire for brevity. The index in our opinion is a model.

Clyde and Other Coastal Steamers. By C. L. D. Duckworth and G. E. Langmuir. Glasgow: Brown, Son & Ferguson Limited, 52/58, Darnley Street, S.1. 8½ in. × 5½ in. × 1½ in. 283 pp. Illustrated. Price 12s. 6d. net.—The Clyde, as the birthplace of commercial steam shipping (at any rate on this side of the Atlantic) has always exercised a peculiar fascination for the transport enthusiast, and to the many who are avid for every detail of information available for the various coastal fleets operating from the Clyde, this book will make a strong appeal. As in the previous book by the authors, "Clyde River and Other Steamers," the companies are dealt with individually. The first six chapters are devoted to the growth and development of the Coast Lines group, including the Burns & Laird Lines, the British & Irish Steam Packet Company, and the Belfast Steamship Company. Early West Highland steamers before the days of David Hutcheson & Co. are then described, and subsequent chapters deal with the vessels of the Clyde Shipping Company and of William Sloan & Co. Finally, two chapters are devoted to the various Clyde coastal vessels. There are over 70 most interesting illustrations, some hitherto unpublished, and in an appendix details are given in tabular form of dimensions, machinery, and so forth, of the vessels concerned. There are also "family trees" of the various shipping companies concerned, showing in graphic form the evolution of the undertakings and the dates when component companies were absorbed. A useful index completes a valuable reference volume.

The Track of the Coronation Scot.—The cover is a telling weapon for evoking interest in a new edition of a well-known publication, and in designing this feature for a re-issue of its "Track of the Coronation Scot" booklet, the L.M.S.R. has broken away from the obvious by selecting a scene showing permanent way, bridgework, and signalling—but no train. The booklet is arranged to fold for the pocket, being stitched down the middle so that the right-hand portion opens to show the route from Euston to Crewe, and the left-hand portion gives the continuation to Glasgow. Mr. Edmund Vale, whose painstaking and ingenious methods of ensuring completeness and accuracy in railway route-books were entertainingly described in his autobiography, "Straw into Gold," writes an introduction that will encourage the reader to travel with an intelligent eye on the landscape. There

are also introductory notes on the formation of the train and its locomotives, and tables of distances and passing times. The route diagram retains the form made familiar in L.M.S.R. publications of this type, consisting of a schematic representation of the railway with simple conventional signs for stations, bridges, and other features to assist in spotting the features of interest alongside the line that are indicated in the marginal notes.

Pneumatic Tools.—From the Consolidated Pneumatic Tool Co. Ltd., of London, S.W.6, comes a copy of the latest edition of the firm's publication S.P. 229, which illustrates and describes the various machines it manufactures. Many of them will be shown at the forthcoming Engineering and Marine Exhibition at Olympia.

Special Steels.—Hadfields Limited, of Sheffield, has sent us two folders setting out in tabular form, the characteristics of steels for special duties. One of these lists ranges for automobile and aircraft engineering, all steel conforming to B.S.I. and Air Ministry specifications. The second folder tabulates various steels resistant to heat and corrosion, showing their characteristics in brief and typical applications.

Smiths' Hearths and Blowing Fans.—The fans shown in this new illustrated catalogue of Keith Blackman Limited, of Tottenham, N.17, may be put to many duties where a continuous service of air at moderately high pressure is required—providing blast for smiths' hearths, fires, and furnaces, supplying clean air to sewage pump chambers, blowing dust from machinery, and so on. The catalogue includes also several ranges of smiths' hearths and portable forges.

Lead Bronze Bearings. London: The Copper Development Association, Thames House, Millbank, S.W.1. 6 in. × 8½ in. 48 pp. Illustrated.—Copper-lead bearings have been in use in this country for a number of years, and a publication recently issued by the Copper Development Association, Thames House, Millbank, London, S.W.1, ranked as C.D.A. Publication No. 33 provides a useful summary of information on their properties and methods of production and application which is likely to be of interest to all engineers concerned with bearing problems. The book was first published in Germany by the Deutsches Kupfer-Institut, and in the preparation of the English version care has been taken to follow the original text as closely as possible. Copies of the book may be had free of charge from the Copper Development Association at the address given above, by those making application on firms' headed notepaper or otherwise giving evidence of responsible status or genuine interest. It contains 48 pages and is printed on high quality paper. The drawings and photographic reproductions are numerous and the contents provide a very useful survey of the subject.

THE SCRAP HEAP

A retired engine-driver, George Smith Shadlock, of Mirosa, Heneage Road, Grimsby, who died last June, left £3,735.

On August 21 the Great Western Railway, in co-operation with the firm of E. W. Rudd Limited, despatched from London to South Wales two kilns each measuring 77 ft. long by 9 ft. maximum diameter, and weighing 40 tons apiece. The train service had been worked out to avoid disturbance to passenger schedules, and the kilns were under constant supervision for their 160-mile railway journey.

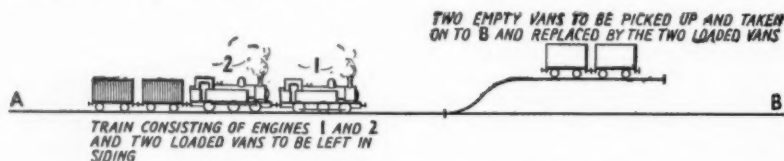
A tabby kitten, reports the *North Mail*, was recently found crouching on a carriage bogie of a Marylebone—Newcastle night express on arrival at Tinsley, near Sheffield. Mysterious mewings had been heard at Leicester, but although the guard searched the train he discovered nothing. As the northwards journey continued, several passengers reported hearing cries when the train was running slowly. Tinsley is nearly 170 miles from London.

The Worcester plum season being now at its height, the G.W.R. alone is running 12 plum expresses daily, timed to reach London, the big provincial markets, resorts on the north, south, east, and west coasts, and places even north of Perth in Scotland within 24 hours of being picked. Additional staff has been sent to the stations and in some cases road services augmented to convey the fruit direct from the trees to the trucks. From Evesham alone it is expected that 15,000 to 20,000 tons of fruit will be despatched.

AN OPERATING PROBLEM

Mr. J. J. Padmore, of Gedling, Notts, sends us this interesting traffic problem:—

A train has to be dispatched from A to B down a single line midway along which is a siding with the points facing towards A, capable of holding only two vans or one engine. It is decided to couple a light engine (1 in diagram), also waiting to proceed to B, to the train-engine (2 in diagram) and its two loaded vans. In the siding are two empty vans to be picked up and taken on to B, and replaced by the two loaded vans. What movements would be necessary to carry out this operation? (Solution next week.)



"An operating problem" (see paragraph above)

A story from New York brings back memories of the days when the West was really Wild. It concerns Train No. 43 out of Chicago on the Illinois Central Railroad. Two bandits, wearing overalls and masked with soiled handkerchiefs, swung aboard the express as it was pulling out of Onaraga station, Ill. One of them "covered" the engine-men; the other pointed his gun at two trainmen in the baggage car and made them "stick 'em up." But his prisoners would not reveal the whereabouts of a box with \$11,000 intended for the army at Rantoul, and during interrogation one of the mail clerks, unseen by the bandit, drew a gun. The bandit fell, wounded in the leg. Meanwhile his accomplice on the footplate realised that the time had come for a "getaway" and jumped into a confederate's car, which was keeping pace with the train. Not until the train arrived at Champaign did the passengers learn of the adventure.

MILLIONTH VISITOR TO "CORONATION SCOT" AT NEW YORK WORLD'S FAIR

The distinction of being the one-millionth visitor to inspect the L.M.S.R. streamlined express train the Coronation Scot since it was placed on exhibition at the New York World's Fair in April, has been gained by Mr. Ernest Rhodes, a native of Huddersfield, Yorkshire. Mr. Rhodes, who has lived in America since 1881, when he was four years of age, is now an engineer (engine-driver) with 39 years' service on the New York, New Haven & Hartford Railroad.

"Gee; She's a pretty slick job and I'd sure like to drive her; there's nothing like it over here," said Mr. Rhodes when officials showed him over the Coronation Scot.

During its 3,000-mile pre-exhibition tour of 38 American cities and towns, 419,000 people inspected the train.

A correspondent who recently made a long journey by road in the United States after numerous rail journeys in that country, says that on the former " . . . we did a great deal of 70 m.p.h. speed, but the countryside as in England is being ruined by advertisements for everything under the sun including beds, hot dogs (instead of tea and Devonshire cream as in England), so that I think the railroads should now adopt a new slogan—'Travel by train and see the scenery.'"

A correspondent sends us a cutting from a recent issue of the *Southern Daily Echo* which reveals some interesting facts about the Southern Railway owned port of Southampton. It was a squeeze to get the new 34,000-ton *Mauretania* into the King George V Dock, London, but Southampton Docks can easily accommodate ships of a much larger tonnage. During the past twelve months there have been 184 arrivals and departures by ships of over 30,000 tons, and 140 by ships of over 40,000 tons. This month 33 ships will be making the journey from Southampton to New York, so that were their sailings staggered a daily departure could be arranged.

MASKS AND GOGGLES FOR PASSENGERS

When the first main-line railway in Germany was opened in 1839 between Leipzig and Dresden, the same practice was followed as on the early English lines of making the third class vehicles open and unprotected from the weather. The line speedily became very popular—the track had to be doubled in the next year—and the open vehicles were especially well patronised, not only because of the cheap fares but also, it is said, on account of the clear view they afforded of the countryside. The passengers were provided with half masks of gauze and goggles—so-called "steam vehicle spectacles"—as a protection against the smoke and grit from the locomotives.

THE INVOLUNTARY PHILANTHROPIST

The first attempt to construct a railway between Vera Cruz and Mexico City had been made as long ago as 1842, but it was not until 1864 that the Imperial Mexican Railway Company was formed in London and the task undertaken in real earnest. Considerable progress had been made when the country was plunged into the turmoil of revolution, but finally in 1872 the line between the coast and the capital was completed. It was a magnificent engineering feat, this line which climbed from sea-level to 7,500 ft. above the ocean. In 1912 Mexico was again plunged into revolution, and when in 1920 the railway was restored to its owners it was little more than a heap of scrap iron. The line had to be reconstructed and new locomotives and rolling stock purchased. The electrification of the mountain section enormously increased the capacity of the line and gave to Mexico a first-class mountain railway unsurpassed in any other part of the world. It was a heroic recovery. But meanwhile there had been a drastic change in social conditions. The labour leaders loved to rant about the exploiting foreigner. If anyone had been exploited, I could not but reflect, it was that involuntary philanthropist, the British investor.—Condensed from "An Eye-Witness of Mexico," by R. H. K. Marett.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

INDIA

E.I.R. Deliberate Derailments

In view of the series of derailments and attempted derailments on the East Indian Railway, in many cases attended with loss of life, the Bihar Government in collaboration with the railway authorities has introduced a system of police patrols over the E.I.R. lines traversing Bihar as a precautionary measure against further sabotage. A special police force consisting of 454 constables with necessary officers, in addition to the usual contingent of police employed on the railway, has been employed since April last to guard the track by night. The main and grand chord lines have been divided into nine and five sections respectively, and the special force is divided up into patrols of three men armed with *lathis* (staves) and provided with electric torches to inspect the track and particularly rail joints.

An appeal seeking the co-operation of the general public against organised train-wrecking has been widely distributed in the villages adjoining the railway. Though the scheme is now sanctioned for only six months, it is hoped that the patrols will not be withdrawn until it is definitely known that sabotage has been rooted out.

Railways and Posts and Telegraphs

A number of disputed points between the Railway Department and the Posts & Telegraphs Department have been adjusted as a result of departmental negotiations. The issues in dispute included the departmental carriage of mails belonging to the railways, which, the Postal Department claimed, infringed the statutory monopoly of the latter for the carriage of all mails, the use of telegraph lines by railways, and the allocation of revenues from private telegrams booked at railway stations.

New Railway Projects

The Railway Board has under consideration the construction of a branch line on the metre gauge between Kashipur and Kalagarh in the United Provinces, a distance of about 31 miles. The line, which is estimated to cost about Rs. 19 lakhs, will if sanctioned, form an integral part of the Rohilkund & Kumaon Railway, and will traverse fertile and populous areas in the Naini Tal, Moradabad, Bijnor, and Garhwal districts. The locality is not served by any provincial roads and the existing unmetalled roads are impassable for wheeled traffic during the rains. Apart from its general convenience to the public, it will facilitate the transport of forest produce and the principal crops grown in the area.

During their recent visit to Madras,

the Chief Commissioner of Railways and the Financial Commissioner discussed with the Prime Minister of the Madras Government the financial aspects of the proposed lines between Tanjore and Pudukottai, and between Arantangi and Karaikudi. The suggestion considered was for the floating of a new company with the district boards as shareholders.

Railway Problems Discussed

The Committee of the Bengal National Chamber of Commerce met Sir Guthrie Russell and Mr. T. S. Sankara Iyer, who arrived in Calcutta on July 31. The committee drew the attention of the Railway Commissioners to the cumbrous procedure involving six or seven stages for obtaining delivery of goods at Sealdah. Sir Guthrie pointed out that the inconvenience arose out of the lack of space. The Eastern Bengal Railway was considering the construction of a new building in place of the existing one, and the Chief Commissioner hoped that the inconvenience would be removed when this scheme materialised.

Calcutta Electrification Not Justified

On the suggestion that suburban railway communications on the E.I. and E.B. Railways should be improved by the provision of electric traction, Sir Guthrie, while expressing his sympathy with the proposal, stated that suburban electrification could not be taken up as it would involve a capital expenditure of nearly Rs. one crore (£750,000) with little prospect of an adequate return.

The Indian Chamber of Commerce discussed with the Railway Commissioners the question of the establishment of a well-equipped workshop for the manufacture of locomotives and other railway requirements. In the opinion of the Chamber such an undertaking was essential not only from the point of view of national efficiency but as an avenue of employment for thousands of workers. The necessity for the introduction of air-conditioned services between Howrah and Delhi was also raised.

ARGENTINA

New State Railway Branch

A Government Decree, issued on July 7, authorised the State Railways administration to construct a branch line from Santa Rosa, on the Central North Argentine Railway, to Transito, on the Cordoba Central Railway, and also to carry out renewals to the 41 km. of line between Dean Funes and Cordoba, on the first-mentioned system, at a total cost of \$1,400,000 paper. The Decree states that the new branch is indispensable, in view of the

increased traffic resulting from the fusion of the C.N.A. and C.C. systems.

VICTORIA

Winter Sports and Railways

The Railway Department's valuable work in the development of the Mount Buffalo National Park and Mount Hotham has been considerably enhanced in recent years by the appointment, each winter, of Continental skiing instructors, at Mount Buffalo since 1936, and at Mount Hotham last year. As a result, over 3,000 people have benefited by their tuition. Two more skiing experts arrived from the Continent in June.

Also, in conjunction with the State Tourist Committee, the clearing and grading of tracks and ski runs at both resorts have been systematically carried out. At Mount Buffalo, that latest of Alpine attractions, a ski-tow has been installed by the Railway Department.

"The Chalet" at Mount Buffalo National Park is one of the finest guest houses in Australia, and has recently had important additions made to it. "Hotham Heights," destroyed by the great bush fires, has already been rebuilt on the original site, 6,000 ft. above sea level. Since 1936 there has been a Snowline Representative at Harrietteville, an experienced skier, who provides personal escort for skiers proceeding beyond that place to "Hotham Heights," and to the "Hospice" at Mt. St. Bernard and "The Bungalow," Mt. Feathertop, though the two latter also were destroyed in the fires.

The Buffet Car Service

Two more air-conditioned buffet cars were placed in service during June. One runs daily, Monday to Friday, on the 5.52 p.m. train from Melbourne to Warrnambool and returns on the 7.20 a.m. service. The other works to Horsham on the 2.30 p.m. daily (Monday to Friday), returning on the 8.15 a.m. from Horsham. Three more cars are to be built, two for the Mildura and one for the Bairnsdale line.

For the convenience of the 39 girls employed on these buffet cars, and for others working in the laundry, a series of comfortable rest rooms has recently been provided by the administration, replete with roomy lounges, restful armchairs and settees, hot and cold showerbaths and every comfort.

PORTUGUESE EAST AFRICA

Visit of Portuguese President

On July 28 General Carmona, the President of the Portuguese Republic, arrived at Beira on a State visit which is historic as the first occasion on which the head of the State has visited the colony of Mozambique. The Beira Railway Company took part in the arrangements to welcome him and, in conjunction with the Beira Port Works

Company, decorated the harbour area and railway buildings. Moreover, a train of coaches was stabled at the station to provide additional hotel accommodation for the large number of visitors to the town during the Presidential visit; also, at the Savoy Hotel, which is operated by the railway administration, an annexe and an additional dining room were provided. A further feature of the visit was the Manica and Sofala Exhibition at which the Beira Railway, the Beira Port Works, and the Trans-Zambesia Railway shared a pavilion. Among other exhibits in it was a model of the new Beira railway station. Apart from the large number of Europeans, principally from Rhodesia, travelling by excursion train to Beira, the railways were called upon to convey several thousand natives of the Mozambique Territory to welcome His Excellency at Beira.

New Station at Beira

For some years the need for a new and modern passenger station at the port of Beira has been realised, and authority has now been given for the construction of a building in keeping with the growing importance of the sea terminal of the Beira and Rhodesian railway system. Work has already begun on the rearrangement of the tracks serving the station area and the new station will be put in hand soon after the Portuguese President's visit. It will consist of a brick building of imposing appearance with a large concourse surrounded by public rooms and office accommodation. At first, one wide roofed platform, 860 ft. in length, with a track on each side, will be provided, but the layout will permit of the provision of a second platform at a later date. As the building, which is double-storeyed at one end, is being erected at only a short distance from the Chiveve Creek on reclaimed land, the foundation work will be heavy.

Passenger traffic to and from Beira is largely in connection with steamships serving East Coast ports, but during the winter, and cool season, the port is becoming increasingly popular with visitors from Rhodesia and Nyasaland desiring a seaside holiday. There is a daily service to and from Rhodesia and twice-weekly trains run over the Trans-Zambesi Railway to Nyasaland.

SOUTH AFRICA

Union—Portuguese West Africa Air Service

Some months ago an agreement was entered into between the Union and the Portuguese Governments for the establishment of an air service between Angola and South Africa. The agreement provides that Portugal may inaugurate a commercial air line between Angola and Union territory, or respective territorial waters, and a regular line from Loanda to Germiston via Windhoek. The Union Government further agrees that the Portu-

guese air service be run by Government grants, the Union to have equivalent rights to establish a commercial air service between the Union and Angola, run by Government services or private companies from Germiston to Loanda, flying over Angola territory from the mouth of the Cunene River and landing at Mossamedes and Lobito on the way.

A further extension of air services proposed by an interested party may be agreed upon at any time; also both countries must provide the usual wireless and meteorological facilities and technical assistance, duty-free storage of planes in each other's territory, and spare parts for use in emergency.

A Five-Year Agreement

The agreement, which is to be immediately implemented by the acceptance by Portugal, will be valid for five years and will automatically extend to further periods of five years unless one party denounces the agreement by giving six months' notice before the five-year term ends.

South African Airways will carry at lowest possible rates all officials, civil or military, entering or leaving the Union on official business, provided that full-fare paying passengers are not displaced. In addition the Union Government is to carry to and from Angola all first class air mail matter at existing postal rates, even if there should be a surcharge by the Portuguese Government in respect of mail offering from Angola.

Weekly Return Service from August 21

IN THE RAILWAY GAZETTE of May 26 reference was made to a survey flight up the West Coast of Africa with the object of inaugurating this service. On August 21 the South African Airways new direct service will begin, and will operate weekly in both directions, that from Capetown to Windhoek on Mondays and from Windhoek to Loanda on Tuesdays. The return journey will operate from Loanda on Fridays and from Windhoek to Cape Town on Saturdays. The Angola service will also connect with the weekly service at present operating between the Rand and Windhoek via Palapye and Maun, the forward journey being made on

Mondays and the return on Saturdays. On both the forward and return journeys between Windhoek and Loanda, landings will be made at Outjo, Ohopuho, Mossemedes, and Lobito. The journey from Cape Town to Windhoek will occupy 5½ hr. and that from Windhoek to Loanda, 9½ hr.

As a result of the co-ordination of these services it will now be possible for travellers from either Cape Town or the Rand or from any of the intermediate ports of call on regular air services to South West Africa, to fly to the capital of Angola in two days and be back at their starting point after six days.

CHINA

New Nanking-Shanghai Expresses

As from July 20 there have been two accelerated express passenger services each way daily between Nanking and Shanghai. The trains are timed to leave both cities at 8 a.m. and 3 p.m., arriving at 1.30 p.m. and 8.30 p.m., an acceleration of 30 min. over the schedules previously in force. This change enables the round trip to be made in a day, not hitherto possible. Dining cars are run in these trains; the service is provided by Chinese waitresses.

Attempt to Bomb Express

To celebrate the second anniversary of the outbreak of hostilities, Chinese guerrillas detonated a bomb on this line—fortunately for the crew and passengers of the express a few seconds prematurely—as the Nanking-Shanghai express was approaching. The driver managed to reduce speed so that, although the engine and track were damaged, no one was injured.

KENYA & UGANDA

Six Months' Earnings to June 30

The following table shows the earnings, including marine and road services, from principal traffics of the Kenya and Uganda Railways, for the six months ended June 30, 1939, compared with the budget estimates, and the total compared with that for the corresponding period in 1938 also:—

FIRST HALF-YEAR ENDED JUNE 30

	1938		1939		Increase or Decrease
	Actual Earnings	Estimated Earnings	Actual Earnings		
	£	£	£	£	
Passengers	—	92,750	102,156	+	9,406
Parcels, &c.	—	15,011	17,268	+	2,257
Livestock	—	12,259	11,029	—	1,230
Goods	—	1,148,189	1,251,435	+	103,246
Telegraph, &c....	—	28,173	30,138	+	1,965
Total	1,524,132	1,296,382	1,412,026	†	115,644*
				—	112,106†

* Increase over estimated total
† Decrease compared with 1938

RESULTS OF IMPROVEMENTS TO FRENCH LOCOMOTIVES

Modifications to various old passenger locomotives on French railways have produced notable results

TO enable them to be used on light high speed trains alterations have been made, the details of which we reproduce from the February number of our French contemporary, *Chemins de Fer*, to certain 4-6-0 and Pacific locomotives of the former French State Railways. The three classes of 4-6-0 locomotives concerned are:—

- (i) Nos. 230.571 to 230.618 (compound, non-superheated).
- (ii) Nos. 230.619 to 230.705 (compound, superheated).
- (iii) Nos. 230.781 to 230.800 (4-cyl. simple, superheated).

Locomotives 230.590 and 230.618 of the first series were superheated and provided with large steam passages, welded steel cylinders with poppet valves on both H.P. and L.P. cylinders, Kylchap blastpipe, strengthened connecting rods, and centering device on the bogie. No. 230.590 was fully streamlined, and was illustrated and described in *THE RAILWAY GAZETTE* of August 5, 1938 (pp. 235 and 250). The results given below compare the locomotives in their original and modified forms:—

Maximum rate of evaporation	Before		After	
	8,000 kg. an hour (17,640 lb. an hour)		12,000 kg. an hour (26,460 lb. an hour)	
	Horsepower	Cut-off	Horsepower	Cut-off
Maximum drawbar pull				
80 km.p.h. (50 m.p.h.)	776	30/70	1,434	60/70
100 km.p.h. (62 m.p.h.)	806	30/60	1,438	60/70
120 km.p.h. (75 m.p.h.)	594	30/60	1,180	50/70

Two locomotives of the third series, Nos. 230.788 and 230.800, were converted with the object of obtaining the maximum haulage power at 75 m.p.h. The working pressure was raised from 12 to 14 hpz. (174 to 203 lb. per sq. in.), the old Schmidt superheaters were replaced by those of the Houlet type, the valve travel was lengthened and the exhaust lead reduced. The Kylchap blastpipe was fitted, and bogie centering device.

No. 230.800 was equipped with Huet "invisible" streamlining, as illustrated and described in *THE RAILWAY GAZETTE* of December 10, 1937 (p. 1024), and on a train of five lightweight coaches weighing about 180 tons between Paris and Le Havre maintained 87 m.p.h. for about 30 miles. The results of rebuilding are shown below:—

FOUR-CYLINDER SIMPLE 4-6-0 LOCOMOTIVES

—	Before		After	
	6,500 kg. (14,625 lb.)		18,000 kg. (40,500 lb.)	
	Horsepower		Horsepower	
Maximum drawbar pull—				
80 km.p.h. (50 m.p.h.)	990		1,400	
100 km.p.h. (62 m.p.h.)	900		1,360	
120 km.p.h. (75 m.p.h.)	640		1,050	

Though these results were satisfactory, these two modified 4-cylinder simple 4-6-0s were heavier on fuel than the Pacifics in equivalent service. Nor were they so economical

when drawing lightweight high-speed trains as the locomotives 230.590 and 230.618 aforementioned. No. 230.605 of the first series, compound and not superheated, was, therefore, further modified by having the pressure raised from 15 to 17 hpz. (217.5 to 246.5 lb. per sq. in.), and the fitting of a regulator, superheater, and steam piping similar to that on Nos. 230.590 and 230.618. H.P. valve travel was lengthened and clearances reduced, the original L.P. piston valves were replaced by double-orifice valves of the Est type, and Kylchap blastpipe and bogie centering device were fitted. As the original cylinders were kept, the early device for changing to simple working was retained.

The above solution, giving power with economy in working, is the most interesting, but it is expensive, for the fitting of a superheater to a boiler not provided with one is always a costly item. Moreover, it was found in trials that, subject to certain modifications, locomotives of the second series 230.619 to 230.705—superheated compounds—gave equally good results for less outlay. Their superheater steampipes were, however, of rather small section and the badly-designed H.P. cylinders hardly lent themselves to the enlargement of such pipes. This failing was remedied by fitting the now useless cylinders from the older 230.521–230.570 engines in place of the original cylinders. The four locomotives concerned were Nos. 663, 696, 701, and 704, which had their pressure raised to 246 lb. and their copper fireboxes replaced by steel.

Pacific Locomotives Converted

In 1933, thirteen Pacifics of the 231.500 class were converted as follow:—

6	had Dabeg valves fitted to L.P. cylinders.
6	„ Renaud „ „ „ „
1	„ Willoteaux „ „ „ „

No alterations were made to the H.P. cylinders. Since that date more locomotives of this class have been converted as shown in the table below:—

Year	Dabeg fitted to L.P.	Dabeg fitted to L.P. and H.P.	Willoteaux fitted to L.P.
1934	35 locomotives	—	6 locomotives
1935	18 „	1 locomotive	11 „
1936	—	26 „	2 „
1937	15 locomotives	4 „	2 „
1938	15 „	—	—

Twenty-five out of a total of 45 more Pacifics are at present undergoing modifications, which, besides the fitting of improved slide valves, include: the enlargement of steampipes by the substitution of a 30-element superheater with two-piece header for a 24-element; the fitting of a Kylchap blastpipe; the modification of the A.C.F.I. arrangement, and substitution of a feed pump of higher capacity. These alterations, made while the engines were passing through the shops, have increased their power and reduced their coal consumption. Whereas at 62 m.p.h. the original Pacifics had a maximum drawbar pull of only 1,400 h.p., those with improved L.P. valves had 2,200 h.p., and those with Dabeg valves for both L.P. and H.P., 2,800 h.p. When the speed was raised to 75 m.p.h. the horsepower figures were respectively: 1,300; 1,980; 2,670.

In 1937, three Pacifics, Nos. 231.416, 231.605, and 231.610, not scheduled for alteration, had to pass through the shops for complete overhaul, and it was decided to equip them with a 30-element superheater with two-piece header, enlarged inlet pipes, and Kylchap blastpipe. Another batch of Pacifics received only two modifications, confined to the addition of Kylchap exhaust and improvement of original H.P. valve gear.

The power of these locomotives is between that of the ordinary and that of the improved high pressure 4-6-2 machines. In future all "T.P." Pacifics not scheduled to have improved L.P. or L.P./H.P. valves fitted will receive the undermentioned modifications when they are in the shops for overhaul: 30-element superheater with two-piece header; large-section inlet tubes; Kylchap blastpipe.

Performance of Rebuilt Etat 4-6-0 Engines

We are indebted to Baron G. Vuillet for details of runs made with modified 4-6-0 engines on the difficult coastal route of the Western Region between Caen and St. Brieuc. The train (No. 3455) consisted of five cars with a tare weight of 195 tons and a gross weight of 210 tons. On the first run the engine was No. 230.618 of the first rebuilding mentioned. Out of Caen the 1 in 125 gradient was climbed at 45 m.p.h., Carpiquet, 5.4 miles, being passed in 8 min. 45 sec.; thereafter speed ranged from 61 to 74½ m.p.h., and 3 miles up at 1 in 200 were climbed at an average of 67 m.p.h., and a minimum of 64 m.p.h. The 16.6 miles from Bayeux to Lison took 18 min. 10 sec. start-to-stop (schedule 19 min.), in the course of which 3 miles up at 1 in 116 were mounted at an average of 62.1 m.p.h., and a minimum of 58½ m.p.h.; the maximum on this section was 74 m.p.h. From Lison, where the train leaves the Cherbourg main line, the engine ran to St. Lô, 11.5 miles, in 14 min. 30 sec. start-to-stop (schedule 15 min.). After this the ruling gradient steepens to 1 in 66. On a 4-mile bank which begins 2 miles out of St. Lô, and steepens finally to 1 in 66 speed fell from 52½ to 39 m.p.h.; Carantilly, 8.3 miles, was passed in 12 min. 7 sec., and Coutances, 18.3 miles, was reached in 25 min. 45 sec. (schedule 26 min.). From Coutances, Cérences, 9.8 miles, was passed in 12 min. 55 sec., at a reduced speed (service slack) of 43 m.p.h., from which, up a bank of 1 in 66 for 3½ miles, speed fell to 31 m.p.h., recovered to 35 m.p.h., and then fell finally to 30 m.p.h. at the summit, Folligny, 17.0 miles, being reached in 25 min. 23 sec., against a schedule of 26 min.

On a subsequent occasion the same express was hauled by No. 230.663 of the later series, with 246 lb. pressure, and a heavier load of 236 tons tare and 255 tons gross. On the initial 1 in 125 from Caen a speed of 44 m.p.h. was maintained; the 3 miles at 1 in 200 were again surmounted at an average of 62 m.p.h. and a minimum of 58½ m.p.h., while the maximum on the run was 73 m.p.h. The 16.6 miles from Bayeux to Lison took 18 min. 57 sec. start-to-stop, and included some excellent work up the 3 miles at 1 in 116, on which the average was 62 m.p.h. and the minimum as high as 59 m.p.h.; maximum speed on this section was 70 m.p.h. Out of St. Lô, with a reduced load of 220 tons, speed fell from 53½ to 35 m.p.h. up the 4 miles at 1 in 66, Carantilly, 8.3 miles, being passed in 12 min. 50 sec.; the recorder on this occasion did not travel beyond Coutances. Over a road of such heavy gradients, the sharp timing of this express is notable.

A third run was with No. 230.788, one of the modified 4-cylinder simple 4-6-0s, on the main line between Paris and Mantes-Gassicourt. The train consisted of eight cars weighing 266 tons tare, and 285 tons gross, and the Poissy route was followed. Owing to signal checks, it took 22 min. 15 sec. to pass Poissy, 16.3 miles from Paris, and speed was now 73 m.p.h.,

shortly increased to 74½ m.p.h. Up the 1 in 600 to Les Mureaux the speed fell to 62 m.p.h., but on a subsequent run No. 230.793 maintained 70 m.p.h. up this slight grade, and 74 m.p.h. on the level. From Les Mureaux onwards a rate of from 69 to 74½ m.p.h. was maintained continuously, and with a slow stop the 35.7 miles from Paris to Mantes were run in 40 min. 31 sec. (schedule 40 min.), or 38 min. net.

Running of Modified Nord 5-ft. 9-in. 4-6-0s

The 125 well-known 5-ft. 9-in. 4-6-0s of the late Northern Railway, which have boilers identical with the Nord Atlantics and were originally built with steam passages of 25 per cent. greater area than usual, have now been equipped with Lemaître multiple-jet exhaust, and are now capable of exceptional performances, especially in consideration of the relatively small size of their coupled wheels. Engine No. 3642 of this type, with a 9-car train of 350 tons tare and 375 tons gross, on train No. 167 (6.20 p.m. from Paris), was checked by signals up the ascent to Survilliers, taking 26 min. 4 sec. (23 min. net) for the 18.5 miles, but passed Creil, 31.9 miles, in 37 min. 8 sec., and reached Compiègne, 52.0 miles, in 56 min. 5 sec., the net time of 53 min. comparing with a schedule of 55 min. Of this distance 12½ miles of level track were covered at an average speed of 71.5 m.p.h. From Compiègne start, Tergnier, 28.5 miles, was passed in 28 min. 23 sec., speeds of 70 to as much as 74 m.p.h. being maintained on the level, and the minimum up the 1 in 333 past Noyon being 66 m.p.h. After Tergnier there was a minimum of 61 m.p.h. up a 9-mile stretch of 1 in 333, and the 43.1 miles from Compiègne to St. Quentin were completed in 41 min. 51 sec. start-to-stop, schedule being 45 min. The performance on this journey was equivalent to making the run of 95.1 miles from Paris to St. Quentin in 91 min., which is as fast as the schedules of some of the Pacific-hauled *rapides* on this route.

Engines of the same type are used on the Northern Region line from Paris to Le Tréport *via* Beauvais, which has some heavy gradients. At Persan-Beaumont this line crosses the valley of the Oise, from which there is a long climb, culminating in 1 in 100 continuously for all but 7 miles between km.-posts 50 and 61, beyond Laboisière. On the Paris-Le Tréport express 4-6-0 No. 3543, with 353 tons tare and 380 tons gross, passed Méru, 10.3 miles from Persan-Beaumont, in 13 min. 54 sec., at 44 m.p.h., and on the 1 in 100 speed did not fall below 40 m.p.h., km. 61 (the summit) being passed in 20 min. 58 sec. for the 15.3 miles; this performance required 55 per cent. cut-off in the h.p. and 70 per cent. in the l.p. cylinders. On another occasion No. 3662, with the same load, passed Km. 61 in 20 min. 8 sec., speed having fallen no more than from 48½ to 42½ m.p.h. on the 7 miles at 1 in 100. In the Paris direction, from Persan-Beaumont, there is a succession of short 1 in 100 grades to Presles, and then 5 km. (3½ miles) continuously at 1 in 77, with reverse curves of 20 ch. radius, between km.-posts 31 and 26. On a southbound run No. 3543, with 347 tons tare and 375 tons gross, passed Km. 26, 6.5 miles from Persan-Beaumont, in 11 min. 2 sec., having taken 4 min. 39 sec. for the 5 km. at 1 in 76, with a fall in speed from 53 to 35 m.p.h.; cut-off was from 60 to 70 per cent. in the h.p. and 70 per cent. in the l.p. cylinders. With a lighter train of 266 tons tare and 285 tons gross, No. 3662 passed Km. 26, 6.5 miles, in 9 min. 35 sec., mounting the 5 km. at 1 in 76 in 3 min. 58 sec., at an average of 47.3 m.p.h., speed falling from 56 to 43½ m.p.h. on the climb. This remarkable performance required 60 per cent. h.p. and 75 per cent. l.p. cut-offs, and the engine, which in working order weighs no more than 68 tons, must have been developing fully 2,000 i.h.p. to maintain these speeds.

THE BLOWPIPE IN BOILER CONSTRUCTION

Economy of forming and fitting locomotive boiler plates with the gas blowpipe

(From a correspondent)

AS a readily portable source of intense heat, easily controlled and easily localised, the heavy-duty oxy-acetylene heating blowpipe is admirably adapted for the forming and fitting of locomotive boiler plates. In one locomotive boiler shop where the oxy-acetylene flame has replaced former heating methods, completion of several operations previously requiring hours can now be carried out in a fraction of the time. The straightening of pressed flanges on firebox back plates is one of these operations. These plates are first shaped on a heavy press to provide a flange for the riveted lap joints between the back and side plates. This flanging operation leaves an irregular edge which is heated by means of the blowpipe without danger of warping, and then straightened with a hammer and flattener. The flanged fire door opening in the centre of the sheet is also included in this preliminary straightening operation.

The back plate is then placed on a steel straightening block for finishing. Additional local heating and flattening with a sledge hammer and a flattener produce a long, thin taper on the flange. This ensures a straight and smooth edge where the back plate is to be joined to the rest of the outer firebox. The side plates are similarly tapered.

By means of the blowpipe, heat is applied to the joints of boiler and firebox plates which are fitted and bolted

together prior to riveting. When the plates are properly heated, they are hammered into close contact and the bolts are drawn tight until a snug fit is assured. Minor straightening is accomplished with a dolly and a hammer. The use of the blowpipe makes it possible to apply heat, during the fitting operation, to either the end or side plates without heating the rest of the assembly. Because the highly concentrated heat of the oxy-acetylene flame is thus confined to a small area and applied only where it is needed, possible plate distortion requires little consideration.

The oxy-acetylene flame is also used in forming flanged nipples in boiler plate. The nipples in the front plate between the boiler and firebox are formed by heating the metal around the hole with the blowpipe flame and driving the hot metal to the outside of the plate with a tapered punch and hammer. The production of such consistently well-formed nipples has been facilitated by the use of the gas flame as a heat source for this operation. In using previous forms of heating, it was difficult to localise the heat sufficiently to ensure equally good results.

During the performance of work of this type inside the boiler or in other confined spaces, there must be adequate forced ventilation, or the operator should be equipped with a mask that is supplied with air from an outside source.

Shunters' Step on L.M.S.R. Diesel Engines

It is frequently necessary at many marshalling yards, particularly where shunting is performed by the same engine in different parts of the yard, for the shunter deputed to work with the locomotive to ride on it. The practice is either for him to mount the footplate along with the driver if travelling any distance, or to stand on one of the steps leading to the footplate and hold on by means of a grab rail or handle if requiring to move only short distances where there is adequate clearance.

When designing the 350-h.p. diesel-electric shunting locomotives, the L.M.S.R. decided to incorporate a simple form of shunter's step which would be handier to use, save time, and give a more commodious foothold than the usual type of steps to the footplate. It was found practicable in constructing the bed plate to provide a recess with a suitable low step at the opposite end to the cab, and many readers will no doubt have observed this in the illustrations of the L.M.S.R. Company's new batch of diesel-electric engines, published in the *Diesel Railway Traction Supplement* to THE RAILWAY GAZETTE dated August 4, 1939.

A close-up view is given herewith showing the detailed arrangement. It will be noted that the step is easy to mount from ballast level and of adequate width. Two upright grab rails are provided, with a socket and clip for shunting pole. A back plate prevents the possibility of a man's foot slipping through, and suitable treads are fixed to assist good foothold. Similar type steps were incorporated in the previous batch of 350-h.p. diesel-electric shunters—10 Armstrong Whitworth and 10 English Electric, which have been in service for some years at the L.M.S.R. yards at Willesden, Basford Hall (Crewe), and Carlisle.



Shunters' step on one of the L.M.S.R. diesel locomotives

NEW ARRIVAL INDICATOR AT WATERLOO, SOUTHERN RAILWAY

*Matrix card principle for setting stations,
platform and minutes late at one operation*

A NEW train arrival indicator has been erected in the concourse of Waterloo station, Southern Railway, designed to conform in appearance with the two departure indicators and working on a similar principle. Train arrivals, other than boat trains and special workings, are indicated on twelve vertical panels, in each of which there are 29 rotatable louvres bearing station names and rectangular apertures at the top for the display of time due, minutes late (if five or over), and platform. The station names show places directly served by arriving trains and those from which there are connections. Any combination is set up manually by the single operation of a handle.

Station names, times, minutes late, and platform numbers are selected by the insertion of punched cards in a movable slide. The stations served by a train and its arrival time are represented on one card; a second sets the platform number; and a third selects the minutes late. When the cards are inserted, the slide is raised by turning the handle, and the operating rods for the appropriate louvres are also lifted, the others remaining stationary

because they coincide with holes in the cards. The operator has a punch for preparing new cards.

Boat train and special arrivals are set up with movable letters on the central panel.

This is the first time the matrix card principle—used in the company's departure indicators at Waterloo, Victoria, London Bridge, Brighton, and Portsmouth—has been applied to an arrival indicator. The only modification has been to use three cards for setting each panel instead of one, the departure cards combining destinations, time, and platform in one, with provision for blocking holes and varying the indications set when necessary. A departure indicator using matrix cards was erected last year at the Plaza Constitución terminus of the Buenos Ayres Great Southern Railway, and illustrated and described in our November 18, 1938, issue.

The new arrival indicator at Waterloo is in a stained teak frame to conform with the finish of the other indicators, kiosks, and bookstalls in the concourse. The lettering is in gold, and the station names appear in white on a green ground.



The new indicator in the concourse at Waterloo station. In the centre is the panel for announcing boat train and special workings. On left is the telephone box in which arrival information is received from the signal box

ROAD TRANSPORT SECTION

This section appears at four-weekly intervals

Bus Organisation in an Emergency

THE Minister of Transport has recently outlined his proposals with regard to the control in an emergency of road passenger services provided by public service vehicles. The scheme, which has been approved by the Minister's Road Transport (Defence) Advisory Committee, provides that all operators of public service vehicles will be allowed, as a "basic issue," a certain proportion of their normal peace-time fuel consumption requirements. Regional Transport Commissioners will, however, have discretion to authorise further issues to enable operators to provide the essential services for which the basic issue would be insufficient. In order that new services may be provided quickly, and existing services varied to meet changing circumstances, the Regional Transport Commissioners will be empowered to vary existing road service licences and to authorise new services by means of a system of "permits." In view of the restriction in the supply of fuel, some curtailment of peace-time supply will be inevitable. Operators have therefore been asked to consider how this can be effected with the least detriment to the public interest and with the least disturbance of the more essential services; they have been advised to consult with the appropriate Chairmen of Traffic Commissioners on the subject. All operators of public service vehicles have also been requested to furnish the Minister with returns showing the mileage operated and the fuel consumed by their vehicles during each quarter in the year 1938.

London Country Bus and Coach Fares

THE revision of road and rail fares in the London area which came into effect on June 11 did not affect the Green Line Coaches and Country Buses of the London Passenger Transport Board, but, as we recorded in our June 23 issue, it was intended that adjustments on these vehicles would be made later in the summer. The reason for postponing them was that, in respect of parts of the board's outer area, it was necessary to secure the approval of the Traffic Commissioners for the proposed new fares. The alterations have now been approved, and were introduced yesterday (August 27). On the Green Line Coaches single fares continue to be based on the 1d. a mile standard and remain unchanged except in a few cases where the charge was appreciably below that standard. Return fares are based on a charge of single fare and a half, or approximately $\frac{3}{4}$ d. a mile, and their general level, therefore, corresponds with that of the cheap day return fares of the main-line railway companies; as such railway fares within the London Passenger Transport area were increased by 5 per cent. or thereabouts on June 11 last, certain coach return fares have now been increased so as to restore the former balance with the cheap railway returns. On the Country Buses the standard basis of approximately 0.8 miles for one penny for single fares is retained. Only on certain routes in the Guildford area, where the standard has not been applied hitherto, have changes (including reductions) in the single fares now been made. To accord with the general principles underlying the revision of fares on the board's Central Area buses, trams, and trolleybuses, most ordinary return

fares on Country Buses at less than twice the ordinary single fare have been withdrawn. The weekly tickets covering six return journeys, issued only in the Northern Country area, have been based hitherto on a charge of eight times the single fare for the twelve journeys allowed; they are issued for all journeys covered by ordinary single fares of 4d. or more. The basis of charge for these tickets has now been raised from eight times to nine times the ordinary single fare.

Cheltenham Local Bus Services

FOR some years past there has been a tendency for the urban passenger transport of provincial towns to pass into the hands of the large bus companies providing services over a wide neighbouring area, and the latest example of this trend is provided by Cheltenham. There the local services are maintained by the Cheltenham District Traction Company, which was formed in 1900 as the Cheltenham & District Light Railway Company, and, under Light Railway Orders granted in 1900, 1903, and 1904, built in all about 12 $\frac{1}{4}$ miles of street tramway. The first sections were opened in August, 1901, and the system completed in March, 1905. With the exception of a short-lived experimental bus service shortly before the war, the company relied entirely on electric traction until ten years ago. The company's name was changed in May, 1929, to the Cheltenham District Traction Company, and at the same time Parliamentary powers were secured to abandon the trams in favour of buses. The changeover took place gradually during the next eighteen months, and the light railway abandonment was completed on January 2, 1931. The present fleet consists of 29 buses (20 double deck and 9 single deck) maintaining eight local routes. Until quite recently, the whole of the issued share capital was held by the Midland Counties Electric Supply Co. Ltd., but control has just changed hands, and as from July 1 last the whole issued capital is now owned by Red & White United Transport Limited. The new owner has assured Cheltenham Corporation of its desire to continue to do its utmost adequately to serve the needs of the locality in close co-operation with the Corporation. The local authorities can purchase the entire undertaking on December 31, 1950, or at the end of every subsequent seventh year, on giving a 12-month notice and paying the fair market value as a going concern but without any allowance for compulsory purchase.

New German Level-Crossing Law

THE German Government on July 4 passed a new law dealing with level crossings, a subject declared to be of urgent importance on account of the rapid development of both rail and road traffic. The law applies to railways open to public traffic or those having through connection therewith, and to roads suited to general motor traffic purposes. No further level crossings are to be built without very special reasons justifying the sanction of the responsible authorities. Pending ultimate abolition, crossings have their layout modified, or the approach to them improved; warning signals and other devices come under these changes. Proceedings in future will be arranged by decisions taken by the Minister of Transport,

in consultation with the General Inspector of Highways and the local authorities, municipal or county; the Minister for Home Affairs also intervenes in certain eventualities. The law contains several clauses covering the allocation of costs. Where a new road or railway crosses an existing one the expense of providing the bridge—or other facility in exceptional cases—is borne by the newcomer, including alterations to the existing railway or road. Alterations and additions at existing crossings, so far as they are called for by the mutual requirements of the traffic, are to be shared equally by the participants. New points of intersection are to be built on the same basis. When a road becomes of more importance and this necessitates changes, the cost is to be allocated similarly. Maintenance charges are to be borne by street and railway authorities strictly in relation to the equipment associated with their own class of traffic at the point. Costs arising from alterations to one or other undertaking are in general to be shared in like manner, unless circumstances call for special adjustment. Present agreements over costs are affected only partly by the new law, and in some cases not at all for the time being. Disputes are referred to the arbitration of the Minister of Transport and the Inspector of Highways. Tramways in general are regarded as road users, but if operating off public highways are regarded as roads themselves where they cross a railway; they then assume all obligations that would fall on a highway authority at a road crossing. The Minister and Inspector are to issue orders covering the application of the new law to individual cases and allocation of costs already incurred, but agreements already come to between parties remain in force until fulfilment. Austria and the Sudetenland are excluded from the law for the time being. Dr. Dormmüller has already issued an order defining more exactly some of the applications of the new legislation.

Noise Limit for Motor Horns

A STRIKING example of voluntary co-operation between a Government department and the motor transport industry in Great Britain is provided by the agreement which has recently been reached between the Minister of Transport and manufacturers of motor horns. This will have the effect of limiting in future the noise output of horns fitted to motor vehicles, to which end negotiations have been in progress for more than a year between the Ministry and the Society of Motor Manufacturers and Traders Limited, representing manufacturers of warning instruments and of motor vehicles. The society has now given an undertaking to the Minister that, after October 1 next, manufacturers of motor horns will not offer for sale instruments with a loudness exceeding 100 phons under specified conditions of test, except in the case of the wind-driven type of instrument, for which the figure is to be 105 phons. Vehicle manufacturers have agreed to co-operate by fitting to new vehicles manufactured by them only horns which comply with the agreed standard. This satisfactory action is a result of the recommendations made in the final report of the Departmental Committee on Noise in the Operation of Mechanically-Propelled Vehicles. That committee, of which Dr. G. W. C. Kaye of the National Physical Laboratory was Chairman, examined means of limiting unnecessary noise caused by motor vehicles and, as regards horns, stated its view that a loudness limit would greatly reduce annoyance, and that the limit of 100 phons would enable horns to be produced which would be adequate for all ordinary purposes. Earlier agreements based on the committee's recommendations were concerned with motor cycles and sports cars, the manufacturers of which undertook to eliminate excessive exhaust noises. Having regard to the

successful outcome of these negotiations, the Minister of Transport has decided not to proceed for the time being with making regulations which would impose a compulsory limit on the loudness of horns.

Railway-Owned Toll Bridges and Roads

THE ancillary businesses of the four main-line railway companies of Great Britain include such well-known undertakings as docks, steamships, hotels, and canals. Acquisition of canals, with the obligation of continued maintenance, was mostly due to the action of Parliament in requiring the companies to take over these waterways as a condition of obtaining powers to construct railways deemed to be competitive with them. Among the less well-known ancillary undertakings of railway companies are toll roads and road bridges. An interesting survival of early railway legislation, in the shape of a railway-owned toll bridge at Fiddown, Co. Kilkenny, which the Great Southern Railways Company is still under a statutory obligation to maintain, was described and illustrated in the Road Transport Section of THE RAILWAY GAZETTE for November 18, 1938. This is the only instance of its kind in Ireland. In Great Britain toll bridges are now owned by three of the group companies. The London & North Eastern Railway Company now owns no road toll bridges, as the High Level Bridge at Newcastle was freed from tolls more than a year ago, by arrangement between the Ministry of Transport, the railway company, and the local authorities. This bridge contains two decks, of which the upper is used exclusively for railway purposes, and the lower exclusively as a roadway. Toll bridges belonging to the London Midland & Scottish Railway Company include the Connel Ferry Bridge, in Scotland, for all classes of vehicular traffic, and Runcorn Bridge, for foot and bicycle traffic only. Both of these bridges carry the railway as well.

Toll bridges and toll-bars under the jurisdiction of the Great Western Railway Company are all situate in Wales. In the case of the Barmouth Estuary Bridge the tolls are collected by an outsider under contract arranged by the Estate Department of the railway company. The bridge and roadway, Traeth Bach Viaduct, Penrhyndeudraeth, are maintained by the railway company, but the tolls are collected by the trustees of the late Sir Oswald Williams in lieu of ferry rights. There are two toll bars on the tow path of the Swansea Canal, one at Ystradgynlais, and the other at Ystalyfera. At Ystradgynlais, in consideration of an annual payment of 5s. to the railway company, Mr. Rees is permitted to charge persons desirous of passing the toll-bar, and proceeding with vehicles along the towpath, such sums as shall be approved by the company. This arrangement is terminable on one month's notice. At Ystalyfera, in consideration of an annual payment of 5s. to the railway company, Mr. Price is permitted to receive for his own benefit tolls, subject to the approval of the company, from persons with or without cattle, vehicles, &c. Employees of the company pass free of charge. Mr. Price is responsible for the maintenance of the toll gate. These arrangements are also terminable on one month's notice. The company also owns the Penarth Subway under the River Ely. The tolls chargeable for its use by persons, animals, and cycles and other vehicles are those authorised by the Taff Vale Railway Act, 1896.

The Southern Railway Company is the owner of the Old Shoreham toll road bridge, a wooden structure spanning the river Adur, and the duties of toll collector are combined with those of railway signalman at the level crossing adjacent to the bridge. The bridge was authorised by an Act of 1780 (21 Geo. III c. 35). It was constructed by trustees and later acquired by the

Duke of Norfolk, who owned it until it was taken over by the L.B.S.C.R. in 1860. The Lymington road toll bridge was authorised by an Act of 1856, and was purchased by the Lymington Railway Company about 1859 and acquired by the L.S.W.R. in 1879. Brading Harbour (I.W.) bridge was constructed under the powers of an Act of 1874 (37 & 38 Victoria, cap. 195), which authorised the Brading Harbour Company to make an embankment and landing quay at Brading Harbour, and a railway from Bembridge to the Isle of Wight Railway at Brading. Under the Brighton & Chichester Railway Act, 1844, the railway company was authorised to construct a road from Arundel to give access to Ford station. Later, a new road was built by the local authorities across the railway at Ford, providing a direct route between Arundel and Littlehampton. A toll was charged by the railway company for the use of the level crossing which linked the two roads.

In 1937 the Arundel—Ford road was taken over by the West Sussex County Council and the toll at Ford was abolished. The King's Ferry Bridge over the Swale, connecting the Isle of Sheppey with the mainland, was built to carry both rail and road. As the Swale was a navigable waterway, a lifting bridge was required. Early in the present century an application was made to Parliament by the South Eastern & Chatham Railway Companies Managing Committee to rebuild the bridge as a fixed structure. These powers were refused, and the Scherzer type of rolling-lift bridge was adopted and opened in 1904. By arrangements between the Southern Railway, the Ministry of Transport, and the Kent County Council, the bridge became toll-free for road traffic in 1929. The Langston Bridge, authorised in 1823 to connect Hayling Island with the mainland, was acquired by the L.B.S.C.R. in 1878.

Alternative Fuels for Road Transport Engines

NOT many years have elapsed since the alternative fuel for road transport engines was heavy oil, but within recent times oil engines in new construction have led petrol engines, and in most countries can be considered more or less as the standard type of commercial vehicle engine. The widespread if not intensive move towards the use of other fuels during the past two years is not the result of any deficiency of the modern petrol or oil engine. It is entirely the result of the search for national economic self-sufficiency, and it has yet to be proved that any one of the alternative fuels and systems tried has sufficient technical merit to stand on its own legs without government subsidies, except in small-scale applications operating under special local conditions.

In Italy the government pays two-thirds of the cost of conversion of any public transport vehicle to use a home-produced fuel. In Sweden the government pays a subsidy for each producer-gas vehicle and the taxation is less; and in Germany producer-gas and liquid-gas vehicles have a taxation rebate. Reduced taxation is granted in France, and every owner of 10 or more buses or lorries is supposed to have at least 10 per cent. of his fleet operating on producer gas. According to a recent German legislation, as from October 1 next (in Austria from April 1, 1940) all buses with carburettor engines and having sitting and standing room for more than 16 persons, are to be driven only by gaseous fuel, in particular with liquefied gas.

Available as alternative fuels at the moment are producer gas, low-pressure town gas, high-pressure town gas, liquefied gases, and, if it can be called a substitute, hydrogenated petrol. These are the fuels which can be and are actually used in service, but experiments have been conducted with cracked ammonia, hydrogen, vegetable oils, and acetylene, and the national alcohol type of fuel has had a large use in the Czech and Slovak States. Despite the large amount of propaganda, producer-gas systems are not yet in extensive use, and as far as can be traced, only a little over 20 per cent. of the motor fuel used in Europe consists of fuels other than petrol and heavy oil, and this proportion includes the relatively large amount of butane and propane used in Germany.

Town Gas

Town gas carried on the vehicle at normal pressure was used as a petrol substitute for road vehicles during the war of 1914-18, and by the end of the war over 5,000 permits had been granted for the use of vehicles so propelled. The fuel was introduced through a car-

burettor. As the maximum storage space corresponded to a mileage of only 20 or so, progress after the war was in the direction of compressed gas, but until well on in the present decade the progress was desultory, except for the Birmingham experiments beginning in 1932. Charging pressures up to 5,000 lb. per sq. in. have been used experimentally, but normally the maximum storage pressure is 3,000-3,500 lb. per sq. in. Nickel-chromium-molybdenum steel bottles with an internal diameter of about 8 in. and a capacity of 1½ cu. ft. are general, and with a pressure of 3,000 lb. per sq. in. the capacity of each bottle is 330 cu. ft. of free gas.

Measurements have shown that to compress 1,000 cu. ft. of free gas to 3,500 lb. per sq. in. requires the output of 10 to 12 h.p.hr., and an all-in figure of 12d. per 1,000 cu. ft. of free gas has been given as representative of the cost of compressing the gas. The Birmingham experiments showed that on the basis of a fleet of 50 buses running 50,000 miles a year each, the cost of gas compression would be about 14d. per 1,000 cu. ft. of free gas of a calorific value of 475 B.T.U. per cu. ft. gross. Approximately 265 cu. ft. of free gas appear to be equivalent to one gallon of petrol in actual road service, and about 365 cu. ft. to one gallon of diesel oil.

Most of the engines used in conjunction with compressed gas are converted petrol engines, and rarely give more than 85 per cent. of the power output obtainable when using petrol. Were the engines to be specially designed for gas, however, and use made of the most modern methods of high-pressure gas fuel injection in conjunction with high compression ratios, there appears to be no reason why the engine output and performance should not attain the level of petrol and diesel engines, but the development of a satisfactory method of enriching coal or coke-oven gas may be necessary.

Dual-fuel engines are being tried in England—the gas being introduced through a form of carburettor during the suction stroke, and a tiny jet of oil forced into the combustion space at the end of compression in order to initiate combustion, as the temperature of compression even with diesel cylinder proportions is not enough to cause self-ignition of the gas. At the moment, low-pressure gas is being used in the trials, but in other experiments abroad a jet of high-pressure gas is forced into the combustion space after the compression of air only.

Compressed gas is used for nearly 400 vehicles in France, among them refuse-tipping wagons; and in the wagons used by the municipality of Bordeaux the gas is used as the power for tipping the platform and sliding

a door, as well as for the motive power. The cost of conversion of a lorry is £60 to £65, and the price of gas rarely exceeds about 1d. for 35 cu. ft. of free gas. Some of these 5½-ton lorries with 85 b.h.p. engines run 34-35 miles per 1,000 cu. ft. of free gas. There are about 50 public filling stations, as well as numerous others belonging to municipalities and private owners. In Germany, too, there is a network of gas-filling stations with charging pressures of 3,000 to 5,000 lb. per sq. in.

Producer Gas

Of all alternatives, the self-contained producer-gas plant has received most publicity, but, though the types of plant are legion, only a small proportion of vehicles on the road is fitted. As far as can be ascertained, there are about 10,000 producer-gas wood-burning vehicles in Europe, including about 5,000 lorries and buses in France. In Rome alone there are nearly 100 wood-burning buses, but at the end of last year only 23 producer-gas vehicles were registered in Great Britain. Wood, charcoal, anthracite, low-temperature and high-temperature cokes, coal, and lignite are used as fuels, but whatever the type of fuel the producer-plant makes the vehicle rather cumbersome except when designed and built throughout for gas operation. In any given petrol or oil engine converted to gas working there is a power loss of 15 to 30 per cent. This may not be serious if it occurs at the top end of the speed range, for a good many oil and petrol engines built three or four years ago are, if anything, overpowered. But if the loss should occur at the lower speeds, it may be serious if the district is at all hilly or the stops frequent.

The fuel costs are appreciably cheaper than in petrol-engined or oil-engined vehicles. Tax free home-produced fuel is used, compared with, in England, petrol or diesel oil taxed 9d. a gallon, and of high purchase price. About 15 lb. of anthracite may be regarded as equal to a gallon of petrol, and 20 lb. or more to a gallon of diesel oil, but at least 25 lb. of wood are necessary to give the same performance as a gallon of petrol. The cost of fuel and fuelling for the 31-seat bus of the Highland Transport Company, burning Suncoke and anthracite in an H.S.G. producer, amounts to 0·65d. or 0·7d. a mile, equivalent to £120 a year compared with £136 for diesel oil, but no general data have ever been produced to show that producer-gas buses are lighter in maintenance and repairs than the better established types, and the gross operating costs do not appear to be less.

In the Haute-Saône department in France, 18 charcoal-burning producer-gas buses averaging 93 miles a day, cost 4·64d. a mile to operate, including overheads, and of this total the fuel charges amounted to 0·86d. a mile. Old railway sleepers are a favourite fuel for producer-gas plants in France, but in all-wood-burning types the producer needs careful watching to obviate tarring of the valve and sparking plugs. Advantages of the producer-gas vehicle are that fuel in the form of anthracite, coke, or wood can be obtained anywhere, and the smell or smoke of the exhaust presents no trouble.

Liquefied Gases

Among the by-products of processing crude petroleum and lignite are butane and propane. Large quantities of these are available in the U.S.A. and Germany, and are widely used for commercial vehicles and tractors. In Germany alone, 22,000 vehicles use such fuels, and the production is linked up with the production of petrol from coal and lignite, which is constantly increasing. Butane can be liquefied at the low pressure of 36-40 lb. per sq. in., whereas propane requires a pressure of 110-115 lb. per sq. in., but in either case the weight of the cylinders is little more than a petrol tank and petrol for equal

mileage. A mixture of the two liquefied gases is used in Germany, and is known as fuel gas. It is stored in light-weight bottles at a pressure of about 200 lb. per sq. in., and its calorific value is appreciably higher than that of town gas. Both types have a certain amount of fire risk, not exceeding petrol, but they are non-poisonous.

Butane-propane has a high anti-knock value, said to be in the neighbourhood of 100 octane. The engines start immediately without the use of special fuel, and there is little smoke or smell. Butane can be obtained in England in small quantities at about 4d. a lb., which on a calorific basis is about twice the cost of petrol, but, if hydrogenation were to be undertaken on a larger scale than at present, the price would doubtless fall.

Vegetable Oils

The youngest of all the substitute or alternative fuels are vegetable oils, but although the supply is almost inexhaustible, they have a volatility too low for direct use without treatment or engine modifications. Oils from the ubiquitous soya bean and palm oil appear promising, but they need preheating to obtain suitable viscosity. Operating on palm oil, a Perkins high-speed diesel engine showed a consumption of 0·392 lb. per b.h.p.hr., and with cotton-seed oil as the fuel the drop in output compared with diesel oil was 10 to 12 per cent. Starting with diesel oil is necessary for soya-bean oil, but once the engine is warm the bean oil fires regularly; the exhaust has a strong smell. Certain of these vegetable oils have a tendency to corrode the usual ferrous and non-ferrous metals, and to change slightly the quality of the lubricating oils, but there seems little doubt that progress will be made in the elimination of these difficulties.

Publications Received

The Motor Transport Year-Book and Directory, 1938-39 (Garcke). Edited by Frederick C. Garrett. London: Electrical Press Limited, 13-16, Fisher Street, Southampton Row, W.C.1. 8½ in. × 5½ in. × 2¼ in. 840 pp. Price 30s. net.—With the present edition this invaluable reference work reaches its 23rd volume, having been founded in 1916. There are 42 pages more than in last year's edition, and the directory includes financial, statistical, and descriptive information relating to 4,270 road transport, aircraft, and allied undertakings. Details are given of the bus and coach undertakings of all local authorities and companies, and of public goods carriers operating ten or more vehicles under "A" licences. Trolleybus undertakings are also covered. Section IV gives the names and addresses of over 5,000 directors and officials in the various undertakings—the only such list available.

The section entitled "Road Transport Organisation" includes much more information than its name would suggest, for in it may be found, in encyclopædic arrangement, legal and other data on licensing, taxation, construction, equipment, maintenance, and the use on roads of motor vehicles for public passenger and goods transport. As before, all the data included were verified at the latest possible date before the work went to press. The contents are displayed in a manner which experience has shown to facilitate reference, and the compilers are to be complimented for avoiding that crowding and compression too often found in the pages of reference publications.

The Speed of Melbourne Trams

Trams in Melbourne, the capital of Victoria, are now claimed to be the fastest in the world, as their average speed, including stops, is stated to be 11·58 m.p.h. Other averages are: Toronto, 10·5; San Francisco, 10·07; Los Angeles, 10·33; and Auckland (New Zealand), 10·68 m.p.h. The average speed of London Transport trams is 10·16 m.p.h., a high figure in view of difficult operating conditions.

L.N.E.R. London Cartage Organisation*

This department, established in 1912 as a joint undertaking by the G.N.R., G.C.R., and G.E.R., now operates 595 horses and 761 mechanical units

By J. J. ROGERS

IN 1912 the Great Northern, Great Central, and Great Eastern Railway Companies decided, after exhaustive inquiry, that satisfactory working and economy could be obtained by the amalgamation of their cartage strength in London, and the London Cartage Committee came into existence and took over control of the goods and parcels working, with the cartage and stable staffs. A London Cartage Manager (Mr. F. Saward, of the G.E.R.) and an Accountant and Secretary (Mr. E. Nicholas, of Thompson, McKay & Co.) were appointed, with headquarters at King's Cross. Good progress was made in the co-ordinated working and satisfactory economies were recorded until 1914, when the war broke out, and the enhanced cost of provender, and so forth, coupled with war wages for the staff, considerably increased the costs, and there was, of course, no further comparison possible. Many members of the staff joined the Forces, and eventually women had to be employed to some extent to drive horses and also for general stable work.

Mr. Saward retired in 1919, and was succeeded by Mr. R. H. Todd, and the London Cartage Committee carried on without change until the amalgamation in 1923, when Mr. Todd was appointed Cartage Manager for the Southern Area, L.N.E.R., retaining control of the London Cartage working. Mr. Nicholas retired, and the Chief Accountant took over the accountancy for the Cartage Department.



Single-horse covered van of the L.N.E.R., a type now becoming obsolete

The Goods Manager and Passenger Manager took over street accident claims. Mr. Todd retired in 1930, and the opportunity was then taken to separate the London Cartage working from the Area Cartage Manager. A separate Southern Area Cartage Manager and a London Cartage Manager were appointed, and this is the present organisation.

At the time of the amalgamation there were five provender mills in the Southern Area, namely: one at Holloway, G.N.R.; one at Gidea Park, G.E.R.; one at Lodge Road, G.C.R.; and two at Manchester, G.C.R. As the total



L.N.E.R. 6-ton mechanical horse, and flat trailer loaded with bales

of horses decreased arrangements were made to reduce the number of provender mills, and now the company does not operate any, the Holloway mill having been taken over by an outside firm which supplies under contract the whole of the Southern Area.

The number of horses taken over in 1912 by the committee was 3,248, and there were six motors, the latter worked by Thompson, McKay & Co. at Marylebone. The number of teams was: pairs 395, singles 974 = 1,764 horses; the remainder were used for van-setting work at stations and as relief for working horses. The staff taken over numbered 3,470, including clerical staff on purely cartage work at the main stations.

Many changes have taken place since the committee came into existence, and mechanisation has made considerable progress, as is evidenced by the following figures showing the position at end of 1938: Number of horses, 595; teams, 43 pairs, 318 singles. Mechanical units totalled 761, of which no fewer than 446 were mechanical horses. Mechanisation has enabled the units to go out farther than the horse teams, and this has resulted in giving a better service to the public in the outlying areas of London. Container working is an important part of the cartage business, and the number dealt with daily now reaches approximately 120. To some extent the transport of these increases the cost of cartage, as more often than not it is necessary to run one way empty with the container. There is no doubt, however, that containers have been a great help in retaining traffic to rail, as many traders require door-to-door delivery without intermediate handling.

Many seasonal traffics have to be handled. For example, rhubarb from the Leeds district starts as early as January, and at the peak period 40 to 50 wagons reach King's Cross daily, a large portion of which is carted by the company to Covent Garden and other markets. Green peas are another important seasonal traffic, and the earliest arrivals come from South Essex into Bishopsgate, but this traffic does not now pass in such large quantities as heretofore, owing to road competition. King's Cross also re-

* Reproduced by permission from the "L.N.E.R. Magazine"

ceives a large quantity which begins to pass just as the supply from the Eastern counties is becoming exhausted. The Yarmouth and Lowestoft herring fishing is another heavy seasonal traffic which necessitates special cartage arrangements being made.

Periodical wool sales take place throughout the year. This traffic is dealt with at Mint Street North, and as many as 1,000 bales a day have been dealt with. The traffic is collected from the London dock and up-town warehouses, giving good loads over short runs, and from the cartage point of view is very satisfactory to handle. Christmas parcels necessitate a considerable increase in cartage strength for an intensive period of about one week, approximately 100 additional units being required, whilst additional units also have to be provided for the Easter, Whitsun, and August Bank Holiday periods. The P.L.A. traffic has increased considerably, and special operating and cartage arrangements are now necessary in order to handle it.

Throughout the day the London Cartage Manager's Office is in telephonic communication with the stations. An indication of the position is obtained first thing in the morning, when information is supplied as to the working of market traffic, running of trains, and some idea given as to the volume of general traffic. In the late afternoon the finishing position is obtained and also information as to the market traffic expected during the night, in order to enable the cartage units to be manipulated to the best effect. The general traffic also necessitates adjustment of cartage strength, and this is done by telephonic conver-



L.N.E.R. 4-ton demountable-bodied motor and trailer loaded with containers

sation. When it is not possible to cover all requirements by our own strength, hiring from outside contractors has to be resorted to, but by manipulation of our own strength it is possible to keep this down to a very low figure.

Some idea of the magnitude of the L.N.E.R. London Cartage is given by the following figures for the year 1938: 1,231,022 tons were carted, of which only 2,306 tons were carted by outside contractors; and 20,969,018 parcels were carted, all by the company's own units.

Overseas Notes

Motor Vehicles in Malaya

There were 32,090 passenger cars, 2,392 buses, and 3,568 motor cycles, registered in the Malay States at the end of 1938. Of the passenger cars, 29,042 were private cars, and 3,048 were garage cars and taxicabs. At the same date there were 8,598 commercial vehicles registered, 6,285 of which were lorries and vans for private use, and 2,313 lorries and vans for hire. The mileage of metalled roads in Malaya at the end of 1937, was 5,416, made up as follows: Straits Settlements 992 miles; Federated Malay States 2,939 miles; and Unfederated Malay States 1,485 miles. The foregoing information is derived from the Report on Economic and Commercial Conditions in Malaya, issued by the Department of Overseas Trade (H.M. Stationery Office, 2s. net). The question of transport in Malaya was fully dealt with in THE RAILWAY GAZETTE of July 28 last, at page 137.

Swedish Road Transport

There were 16,482 motor lorries and 2,718 trailers engaged in the public conveyance of goods in Sweden at the end of 1938, according to the Report on Economic and Commercial Conditions in Sweden, issued by the Department of Overseas Trade (H.M. Stationery Office, 2s. net), which means that 31 per cent. of the total number of lorries are used as common carriers, as distinct from those used by firms for their own products. Of the total number, 2,679 were of 2 tons capacity, 9,481 of 3 tons, 3,635 of 4 tons, 484 of 5 tons, and 203 exceeded 5 tons. The heaviest trucks were those best used, with an average of about 85 miles a day. Average income is 26 kroner a day without trailer, and 33 kroner with trailer. It is computed that during 1937 some 41.5 million tons of goods were transported by these public vehicles, and the total paid 134.5 million kroner. During the same period the total of the goods carried by all the Swedish railways was recorded as 46.1 million tons, but allowing for the duplication in the figures resulting from joint traffic over the State and private lines, this should be about 36 million tons. On this estimate, motor vehicles

carried about 15 per cent. more goods than the railways, but the actual transport is only about one-ninth as great, due to the much longer hauls by rail.

Railway v. Private Buses in Quebec

Canadian National Transportation Limited, a subsidiary of the Canadian National Railways, obtained on July 11, from the Quebec Transport Commission, the right to enter into competition with a privately-owned bus service. This is the first occasion on which such competition has been sanctioned. The bus service will run between Victoriaville and Drummondville, two manufacturing towns in Quebec. Mr. Antoine Lamaree, K.C., President of the commission, in granting the permit, remarked that it was novel in the Province of Quebec for a railway to enter this field of public service. Representatives of the Canadian National Railways explained that the new service would enable them to supplement their rail service.

South African Road Motor Services

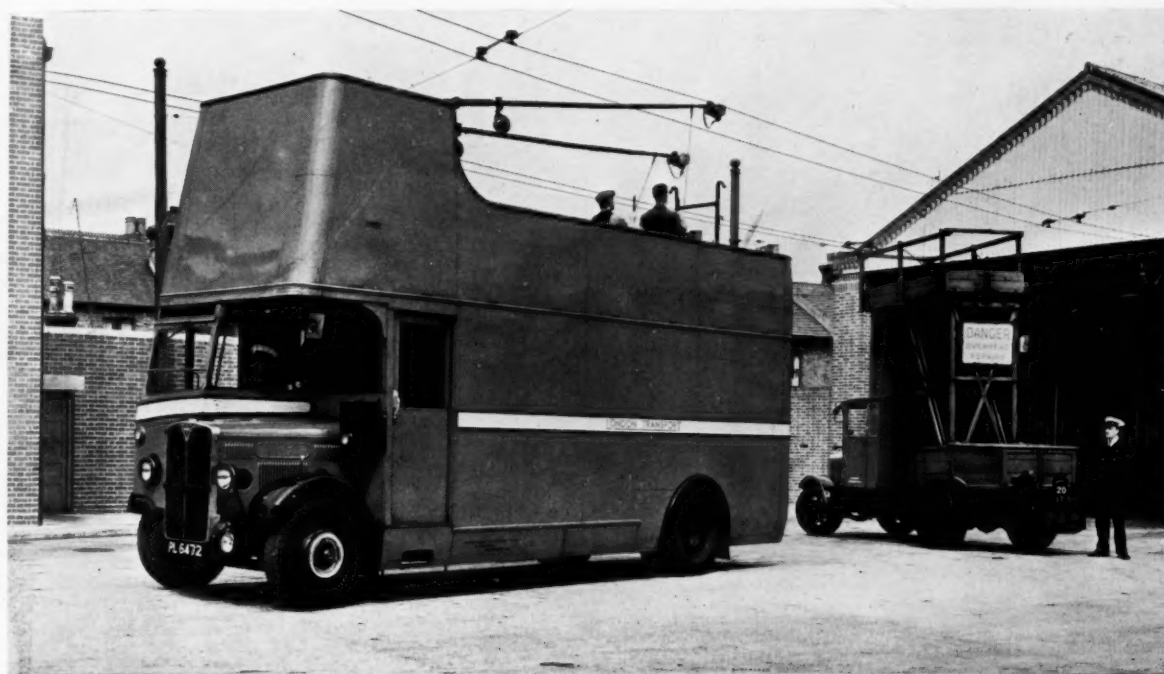
On June 25 last the route mileage of road motor services operated by the South African Railways & Harbours administration totalled 15,324. There have been a number of recent changes, the most notable of which is the establishment on May 1 last of a new service 222 route miles in length between Tsumeb and Oshikango. On May 5 the Montagu—Lemoen-shoek service was extended 7 miles to Warmwaterberg; on May 8 the Vryburg to Broedersput service was extended 27 miles to Delareyville; and on May 25 the 12-mile service between Toise River and Redcone was withdrawn. During the financial year ended March 31, 1939, the road motor services continued to expand, and in the course of a year new services were introduced throughout the country over an aggregate distance of 1,893 miles. The total route mileage over which road motor services are operated is now in excess of the total rail mileage, a striking indication of the extent to which road services have grown during the comparatively short period since the administration embarked upon its programme of road motor expansion. The General Manager's annual report points out that branch railways could not in any circumstances have been built to the same extent as road motor routes have been opened.

Lubricating London Transport Trolleybus Wires

Graphite lubricant is applied to the overhead conductor wires by two specially-built petrol-driven vehicles

TWO petrol-driven service vehicles were specially built in 1936 at the Charlton works of the London Passenger Transport Board for applying graphite lubricant to the overhead conductors on the board's trolleybus system. These vehicles were introduced subsequent to the adoption of the shoe current-collector instead of the trolley-wheel, a substitution made in 1935 to reduce dewirements, and to cut out the unpleasant hiss which often detracts from

resulted in greatly-decreased wear of the overhead conductor. The lubricant is applied by a small distributor, mounted at the extremity of a trolley-boom, two of which, respectively for the positive and the return wires, are anchored to a staging on the roof of the graphiting car. The booms are sprung as a whole, and the distributors are sprung independently, and each of them has the customary range of movement in the horizontal and the ver-



Modern trolleybus-wire lubricating vehicle (T320) alongside the earlier type of tower wagon at Sutton depot, London Transport

the silent efficiency of the trolleybus. The shoe collector, designed after lengthy experiment by London Transport, is a metal U supporting a hard strip of carbon; this carbon insert alone contacts with the wire and when worn—usually after about 1,000 miles—can be replaced easily and cheaply. The shoe system has, of course, the disadvantage common to similar static, as opposed to revolving, collectors, in that it introduces friction which makes a lubrication indispensable. In the past, the lubricant was ordinarily applied to the collector itself; a notable and well-remembered example was provided by the collector bows of the former L.B.S.C.R. overhead electric trains, which were provided with renewable aluminium contact strips having grooves packed with a heavy grease.

London Transport prefers to apply the lubricant to the conductor wire, and does so by coating the latter with a varnish (prepared in the board's laboratory at Chiswick works) made up of a solution of resin in spirit, to which has been added a quantity of finely-divided graphite. The combination of sliding shoe and lubricated wire gives a silent and efficient method of current-collection, which has

tical planes. The distributor is an aluminium casting in the form of a tank to contain the lubricant. A case-hardened steel wheel, revolving on ball-bearings, dips into the fluid, picks up the correct quantity, and transfers it to the under surface of the wire; the action is generally similar to that of a lawn-tennis-court marker. A brush placed immediately behind the distributor-wheel evens out the coating, which dries in a moment to a thin film of graphite that under friction takes on a high degree of burnish.

Lubrication is carried out on both wires simultaneously at a speed of from 10 to 12 m.p.h., and the distributor is kept in track by a dummy shoe embracing the conductor. The tanks cannot, of course, be very large on account of their weight, and it has been found desirable to limit their capacity to two miles for one filling. A supply of lubricant is carried in a drum, provided with a stirrer which must be agitated constantly to ensure even suspension of the powdered graphite in the fluid. Floodlights attached to the trolley-booms give illumination for night work, and there are various plug points for portable hand lamps. So that the work can be done at all times, whether

current is on or not, the vehicle is petrol-driven. It is, in fact, a standard T type chassis, consisting of a 6-cylinder A.E.C. Regal engine mounted on a standard L.P.T.B. four-wheel coach-chassis; the unladen weight of the wagon is 5 tons 19 cwt. 3 qrs. The interior is fitted up as a workshop, and a stairway leads to the roof, which is in communication with the driver's cab by a push bell.

The present lubricating system has been evolved from an experiment carried out in January, 1936, using the earlier type of tower-wagon such as may be seen to the right of the illustration. On the top platform of this vehicle

was mounted a single trolley-pole, carrying a pipe through which the lubricant was hand-pumped on to the overhead conductor. The method was successful in its results, but the fluid tended to dry up within the tube and clog the bore, so that the apparatus needed an extensive and thorough scavenging immediately the flow had stopped. The two lubricating wagons now in use are stationed at Rye Lane depot, Peckham, from which they cover the entire 235 miles of trolleybus route in London. They are also equipped for tree-logging when necessary, and the roof of one of them has a well to receive the clippings.



**Distributing
Corrugated-Steel
Air-Raid Shelters
in London**

LONDON is naturally the largest and probably the most important area to be covered in the comprehensive distribution arrangements for air-raid shelters, to which we referred at page 720 of our May 5 issue. The entire Metropolitan district has been divided between the four main-line railway companies, who, it will be remembered, are undertaking the conveyance of parts, their assembly



into complete shelters, and their delivery to householders. The three views we reproduce show various units of the G.W.R. fleet of mechanical horses engaged in the delivery in London of what are termed officially "galvanised corrugated steel shelters." The G.W.R. is effecting its deliveries from the Paddington and South Lambeth depots.

Two-thirds of the steel sheet manufacturers are situated in South Wales, so that the G.W.R. may be said to be responsible for the transport of many shelters from works to householder.

An Historic Endowed Highway

The causeway between Wick Hill and Chippenham was built under a bequest of 1474 and still bears the name of its patron, Maud Heath

AT the beginning of the public railway era in Great Britain, the country was served by a fairly good system of highways, largely as the result of the efforts of such roadbuilders as Telford and Macadam, and it is often forgotten that this state of affairs was not then one of long standing. Actually, road development was coincident with the industrial revolution and may be dated from the passage of the Road Act of 1766, which repealed

to make provision in 1474 for the construction and maintenance of a causeway between Wick Hill and Chippenham. Over 200 years later the trustees of this road decided to erect a commemorative pillar, and the wording thereon sufficiently sets out the details as follows:—

"To the memory of the worthy Maud Heath of Langly Burrell, Widow, who in the year of Grace 1474, for the good of Travellers did in Charity bestow in Land and



Memorial pillar to Maud Heath, who endowed the causeway



*Above: G.W.R. crossing modern road and ancient causeway
Below: Raised section of causeway in district liable to flooding*

all the earlier Statutes and resulted in the general acceptance of the turnpike system by which trusts were allowed to levy tolls and to devote the proceeds to the maintenance of particular sections of road. Prior to that time road-making and maintenance had been purely parochial matters, and where good highways existed they were often the result of private bequests. From about the year 1200 onward it became a custom for public-spirited individuals to endow road-building by legacies or gifts, and a particularly good example of the results of such generosity is to be found in Maud Heath's causeway, near Chippenham, which exists to this day.

In the neighbourhood of Chippenham difficulty was often experienced as the result of the river Avon overflowing its banks, and it was this which led Maud Heath

houses about Eighty pounds a year forever to be laid out on the Highways and Causey leading from Wick Hill to Chippenham Clift. This Pillar was set up by the feoffees in 1698. Injure me not."

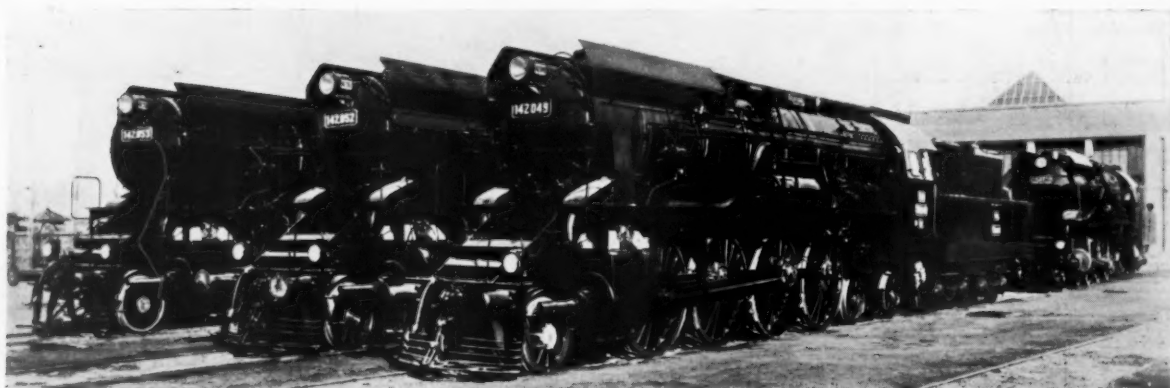
A Bristol correspondent has recently sent us the three illustrations we reproduce, one of which shows the point at which the Great Western Railway crosses both the modern road and the ancient causeway; this section of line was opened on June 30, 1841, and the narrow bridge had to be built by the railway company to preserve the right of way along the causeway. The photographs reproduced indicate the substantial form of the engineering works on the causeway, which, it may be noted, is still marked as Maud Heath's causeway on the Ordnance Survey maps.



Members of the Institution of Signal Engineers and their ladies, during the institution's summer meeting in Nottingham
J. R. Board (see page 300) *[Buxton]*



Flat-bottom track on L.N.E.R. near Bishopbriggs. Elastic spike and clip and bolt fastenings on right, and clip and bolt fastenings on left (see page 301)



The Roumanian State Railways have just acquired ten powerful engines of Austrian design, but built in Roumania by the firm of Malaxa, of Bucharest. The engines are of the two-cylinder single-expansion type, with cylinders 25.6 by 28.4 in.; they are fitted with Caprotti valve gear and Knorr feedwater heating apparatus. The coupled wheels are 6 ft. 4½ in. dia. and the boiler pressure is 213 lb. per sq. in. A tractive effort of 44,100 lb. is developed at 85 per cent. boiler pressure

New 2-8-4 express locomotives for Roumania

RAILWAY NEWS SECTION

PERSONAL

Sir Henry Chapman, C.B.E., Director of the Beira & Rhodesia Railways, is at present visiting the Mozambique Territory and Rhodesia.

Mr. Rowland L. Williams, Executive Vice-President, Chicago & Eastern Illinois Railway Company, has been appointed Chief Executive Officer, Chicago & North Western Railway Company, in succession to Mr. F. Sargent, who resigned on June 1. Mr. Williams, who was born at Salem, Ill., in 1888, entered railway service in 1903 as a messenger boy on the Baltimore & Ohio Southwestern (now part of the Baltimore & Ohio Railway). In 1905 he became a freight and yard clerk, and later a telephone operator. Early in 1907 he went to the Chicago & Eastern Illinois as telephone operator, but in July of that year he was promoted to be transportation timekeeper in the Divisional Superintendent's office. Mr. Williams was subsequently advanced through several important positions to become, in 1918, Chief Statistician in the President's office at Chicago, a title which was later changed to Special Representative of the President. In 1932 Mr. Williams was appointed Assistant to the President, and three years later Senior Executive Assistant. It was in 1936 that he was further advanced to the position of Executive Vice-President, which he has now relinquished to take up his new duties on the Chicago & North Western Railway.

RAILWAY-ASSOCIATED BUS APPOINTMENTS

Mr. Hector N. Tuff, Chief Engineer, Hants & Dorset Motor Services Limited, has been appointed Chief Engineer, North Western Road Car Co. Ltd.

Mr. G. J. Brown, Assistant Engineer, Western National Omnibus Co. Ltd., has been appointed Chief Engineer, Hants & Dorset Motor Services Limited, in succession to Mr. Tuff.

Mr. Francis H. Kidd, at present with Small & Parkes Limited, and formerly Assistant Engineer, North Western Road Car Co. Ltd., has been appointed Assistant Engineer, Western and Southern National Omnibus Companies, Exeter, in succession to Mr. Brown.

Mr. A. R. Goodall, Chief Engineer, East Yorkshire Motor Services Limited, has been appointed Chief Engineer, Crosville Motor Services Limited, in succession to Mr. W. G. Wright, who has retired.

Mr. R. P. Humphrys, whose appointment as Assistant Solicitor, L.M.S.R., was recorded in our August 11 issue, was educated at University School, Hastings, and Clare College, Cambridge, where he took the B.A. Degree in Law in 1912. He was then articled to the late Mr. J. W. Alsop, of the well-known firm of Messrs. Alsop, Stevens, Crooks & Company, of Liverpool. Before he could complete his articles, the war broke out and Mr.



Phot.

Mr. R. P. Humphrys

[Lafayette

Appointed Assistant Solicitor, L.M.S.R.

Humphrys was gazetted to the 7th Battalion of the King's Regiment (Liverpool), T.F. He served with this battalion in France from December, 1915, to April, 1916, and again from December, 1916, to April 9, 1918, on which date he was wounded during the German advance; he was demobilised with the substantive rank of Captain in October, 1919, and had been mentioned in Despatches in 1917. Mr. Humphrys then returned to Messrs. Alsop, Stevens & Company, Liverpool, completed his articles, and was admitted a Solicitor in July, 1920. In March, 1921, Mr. Humphrys was appointed a Solicitor Assistant in the Common Law Department of the London & North Western Railway Company. In 1932 he was appointed Divisional Solicitor, L.M.S.R. at Manchester, which position he held until the end of 1933, when, at his own request, he returned to London. Since then he has held the position of Solicitor Assistant for General Matters.

From *The London Gazette* of August 11: Regular Army, Commands and Staff: Colonel C. Le B. Goldney, M.C., to be Assistant Director of Supply and Transport, and is granted the temporary rank of Brigadier whilst so employed (August 1).

Regular Army Supplementary Reserve of Officers, Corps of Royal Engineers, Transportation:—

Captain J. S. B. Gentry to be Major (July 14).

Lieutenant H. A. G. Baldwin to be Captain (July 8).

The undermentioned to be second lieutenants (August 9):—

G. F. George (late Officer-Cadet, University of London Contingent, O.T.C.), J. A. Patterson (late Officer-Cadet, Edinburgh University Contingent, O.T.C.).

We regret to record the death on August 10 of Sir George Gillett, who resigned last May because of ill-health from the position of Commissioner for the Special Areas in England and Wales. He was born in 1870 of a well-known Quaker family, and for very many years he was active in the social and religious work of the Society of Friends. Sir George Gillett had long experience of local government but his Parliamentary career was, by comparison, quite short. In 1931 he became for a while Parliamentary Secretary, Ministry of Transport.

INDIAN RAILWAY STAFF CHANGES

Mr. D. M. S. Robertson, Chief Operating Superintendent, E.I.R., has been permitted to retire from Government service as from May 7.

Mr. R. Proudlock has been appointed to officiate as Deputy Chief Commercial Manager, N.W.R., as from June 14.

Lt.-Colonel H. H. E. Gosset, R.E., Officiating Deputy General Manager, E.B.R., has been granted 1½ months' leave out of India as from July 11.

We regret to record the death on August 15 in an aeroplane accident in Denmark of Mr. A. C. Crossley, M.P. He was 36, and a Director of Crossley Brothers Limited, and of Crossley-Premier Engines Limited. From 1932 to 1934 he was Parliamentary Private Secretary to Lieutenant-Colonel (now Sir) Cuthbert Headlam, Parliamentary Secretary to the Ministry of Transport, and from 1935 had served in the same capacity to Captain A. M. M. Hudson, M.P., the present Parliamentary

Secretary to the Ministry. He was an all-round sportsman and a graceful writer.

M. Jean Berthelot who, as announced in our July 28 issue, has succeeded M. Surleau as Assistant General Manager, French National Railways, was born at Rheims on August 26, 1897. After seeing war service, first as an N.C.O. and later as a Sub-Lieutenant in the Artillery, he went to the Ecole Polytechnique and the Ecole Supérieur des Mines. In 1925 he entered the service of the Paris—Orleans Railway. Besides the prominent part he played in the organisation of the company and the eminent services he rendered, which earned for him a rapid and brilliant career, M. Berthelot was entrusted by the Comité de Direction of the former French railway systems with missions of particular importance. In 1935, especially, he was given the task of studying various problems concerning traffic and commercial reorganisation; in this direction he worked with resource and confidence, and was guided on more than one point by the experiences of British railways in traffic matters. In August, 1938, M. de Monzie, Minister of Public Works in M. Daladier's Ministry, chose him to be a Minister in his Cabinet. In this position M. Berthelot helped in the preparation of many important legal decrees affecting railways. When M. Surleau, who was appointed Assistant General Manager of the French National Railways on its inauguration, was invested by the French Government with the position



M. Jean Berthelot

Appointed Assistant General Manager,
French National Railways

of Administrator of the City of Marseilles, M. Berthelot was appointed to succeed him as Assistant General Manager on July 1, 1939. He is an Officer of the Legion of Honour.

Mr. T. C. B. Davies, M.C., B.Sc., whose appointment to the post of Div-

isional Engineer, Gloucester, Great Western Railway, was recorded in our issue of August 4, graduated as B.Sc. with Honours in engineering at Manchester University. He spent several years on engineering work in South America, until his duties there were interrupted by service with the Royal Engineers from January, 1915, to early in 1919. He entered the service of the Great Western Railway in January, 1923, as surveyor and draughtsman in the Chief Engineer's Office, and was transferred to the Divisional Engineer's Office, Wolverhampton, in October, 1923. He held successively the posts of senior surveyor and draughtsman, and Assistant in that office, and in January, 1936, was appointed Assistant Divisional Engineer at Gloucester, the position from which he is now promoted.

Mr. Alfred Bond, who, as recorded in our issue of August 4, has been appointed Indoor Assistant, Chief Goods Manager's Office, Paddington, Great Western Railway, as from July 31, entered the company's service in the Horse Department in 1899 and three years later was transferred to the Chief Goods Manager's Office, where he has spent the rest of his railway career, gaining experience of the work on the various sections. In 1916 Mr. Bond went with the B.E.F. to France and was engaged in military service for three years. He returned to the G.W.R. in 1919 and for a time specialised in investigations into the possibilities of use of mechanical appliances at goods stations.



Mr. T. C. B. Davies

Appointed Divisional Engineer, Gloucester,
Great Western Railway



Mr. A. Bond

Appointed Indoor Assistant, Chief Goods Manager's
Office, Great Western Railway



Mr E. W. Hallam

Appointed Chief Assistant to the Assistant Engineer
(Signals and Telegraphs), Southern Railway

In 1927 he was placed in charge of the New Works Section of the Chief Goods Manager's Office, where he remained during a period of abnormal development. In 1936 Mr. Bond also assumed control of the Parliamentary and Special Subjects Section. In June, 1938, he was appointed Chief Clerk to the Chief Goods Manager. Mr. Bond was responsible for forming the No. 4 Railway Operating Company of the Royal Engineers, Supplementary Reserve, which he commanded until it was disbanded.

Mr. E. W. Hallam, Chief Assistant, Signals and Telegraphs, Wimbledon, Southern Railway, has been appointed Chief Assistant to the Assistant Engineer (Signals and Telegraphs), Southern Railway, in succession to the late Mr. W. Challis, whose death was recorded in our issue of January 20. Mr. Hallam was a pupil of the late Mr. J. P. O'Donnell at the Chippenham works of the firm of Evans, O'Donnell, later controlled by Saxby & Farmer Limited, and trained in pattern shop, foundry, locking shop, tool room, precision machine shop, on pneumatic tool manufacture, and pneumatic signalling apparatus. After a period in the drawing office there, he joined the installation staff of the British Pneumatic Signal Co. Ltd., when the pneumatic signalling was being put in between Gorton and Godley Junction on the former Great Central Railway. As a further training in modern drawing office methods, he gained, by virtue of his engineering certificates at the Chippenham Technical Institute, a position as a draughtsman at the firm of James Simpson, hydraulic engineers and makers of pumping machinery. In 1906, Mr. Hallam joined the Signal Department of the Chatham Section of the S.E.C.R., and served in various capacities covering Draughtsman, Inspector, and Assistant. He was appointed in January, 1923, Acting Signal Superintendent of the S.E.C.R., and kept that grade until the grouping. He is a Member of Council of the Institution of Railway Signal Engineers; a Fellow of the Permanent Way Institution, a Member of the American Railroad Association, and an Associate Member of the Institute of Transport.

Mr. W. A. Woodhurst, who had been Agent at the Fleet Street office of the L.N.E.R., retired recently after 42 years' service with the former Great Northern Railway and the L.N.E.R. On August 17 Mr. Percy Syder, the London City Manager, presented him with a silver watch, cut glass flower bowl and automatic lighter subscribed for by his colleagues as a mark of the affection in which he was held. In wishing Mr. Woodhurst a long and happy retirement Mr. Syder referred to the high esteem in which he was held by the firms in the Fleet Street district and mentioned he had received numerous expressions of appreciation

of the manner in which he had studied the interests of the traders whilst upholding those of the company.

CIVIL ENGINEERS' U.S.A. VISIT

About 100 members of the Institution of Civil Engineers, and their ladies, will participate in a visit to the U.S.A. and Canada at the invitation of the American Society of Civil Engineers. The party will leave on August 26, and will carry out the programme outlined on page 301. Those who have notified their intention of attending are:—

Members of Council

Mr. W. J. E. Binnie (President), Professor C. E. Inglis (Vice-President).

Mr. J. R. Davidson and Mrs. Davidson.

Mr. W. T. Halcrow.

Mr. R. F. Hindmarsh and Mrs. Hindmarsh.

Members

Ewart S. Andrews, Leonard Andrews and Mrs. Andrews, E. J. Buckton, Liston Carnie and Mrs. Carnie, F. P. G. Carron, W. H. Carson, E. Graham Clark (Secretary) and Mrs. Clark, S. T. Farnsworth and Mrs. Farnsworth, Lawford H. Fry and Mrs. Fry, H. M. Gell, H. Ross Hooper and Mrs. Hooper, E. E. Jeavons and Mrs. Jeavons, A. J. Martin and Mrs. Martin, G. Parker Pearson and Mrs. Pearson, W. H. Prendergast and Mrs. Prendergast, J. M. B. Stuart and Mrs. Stuart, R. C. S. Walters and Mrs. Walters, A. M. Ward and Mrs. Ward, David M. Watson, Ralph A. Whitson and Mrs. Whitson, W. Storey Wilson and Mrs. Wilson, H. E. Yerbury, Mrs. and Miss Yerbury.

Associate Members

R. E. Broomfield, J. J. Bryan and Mrs. Bryan, R. S. Colquhoun, Arthur Dunbar, H. E. Duncan, J. S. Duncan and Mrs. F. M. Leader, L. Kirk Greene and Mrs. Kirk Greene, A. G. Gullan and Miss R. B. Gullan, C. S. H. Hawkes, Charles F. Hepburn, F. S. Hughes and Mrs. Hughes, Harry Jackson, G. Nicol Lyall and Mrs. Lyall, W. N. McClean, W. W. Marriner and Mrs. Kenneth Marriner, J. T. Morris, S. W. F. Morum and Mrs. Morum, Harold Osmond and Mrs. Osmond, Reginald N. Pegg and Mrs. Pegg, J. G. Pidgeon and Mrs. Pidgeon, C. H. Z. Piercy, Mark Randall, N. Shand and Mrs. Shand, J. Shiffman and Mrs. Shiffman, A. L. Somerville and Mrs. Somerville, Thomas Stuart and Mrs. Stuart, G. F. Vollmer and Mrs. Vollmer, L. Wettern and Mrs. Wettern, B. W. Wilson.

Students

J. W. Fletcher, D. A. A. Fulton, J. G. Graham, George Gray, C. W. Ling, K. C. McCrae, R. H. McKibbin.

Prospective Student

David G. Allan.

The late Baron Emile d'Erlanger, Chairman of the well-known private banking house of d'Erlangers Limited, and one of the strongest advocates of

the Channel tunnel, left unsettled estate, as far as can at present be ascertained, of £460,213; with net personalty £434,572. An obituary notice appeared in our July 28 issue.

B.A.G.S. AND W. APPOINTMENTS

Mr. J. W. H. Rea, Chief Mechanical Engineer, Buenos Ayres Great Southern and Western Railways, is retiring at the end of the current month.

Mr. J. H. Mailer, formerly Chief Mechanical Engineer, Cordoba Central Railway, has been appointed Chief Mechanical Engineer, Buenos Ayres Great Southern and Western Railways. Mr. P. W. Dobson has been appointed Assistant Chief Mechanical Engineer, but retains his post as Locomotive Superintendent of the Buenos Ayres Midland Railway.

Mr. C. A. Muirhead, Agent and General Manager of the South Indian Railway, is on a visit to this country.

We regret to record the death on August 18 of Mr. John Ferguson, a member of the architect's staff at York, L.N.E.R. Mr. Ferguson joined the former North Eastern Railway as Assistant to the late Mr. W. Bell, Chief Architect. He was largely responsible for the erection of the new Paragon station, Hull, and the stations at Whitely Bay and Monkseaton.

Mr. Arthur B. Purvis, President of Canadian Industries Limited, has been appointed to the executive committee of the board of the Canadian Pacific Railway Company.

Mr. Philip G. Johnson, Vice-President and General Manager of Trans-Canada Air Lines (a C.N.R. associate) will retire on September 1, and will be succeeded by Mr. D. B. Colyer, at present Chief Technical Adviser to the company.

NEW GLYN MILLS BOARD

The new board of Glyn, Mills & Company, the alliance of which with the Royal Bank of Scotland was recorded in our August 4 issue, is constituted as follows:—

Chairman, General the Hon. Sir H. A. Lawrence; Deputy-Chairman, Colonel E. Gore Browne; managing directors (in addition to the Chairman and Deputy-Chairman), Messrs. B. F. G. Currie, F. M. G. Glyn, M. D. V. Holt, A. T. Maxwell, Lt.-Colonel the Hon. I. Leslie Melville, and Mr. M. J. Babington Smith; directors, Messrs. A. Maitland, J. T. Tulloch, and W. Whyte; extraordinary directors, Lord Hillingdon, the Earl of Jersey, and Lord Wolverton; local directors, Messrs. A. V. Barber, J. P. R. Glyn, C. G. Randolph, and G. K. M. St. Aubyn. Mr. Maitland and Mr. Tulloch are on the board of the Royal Bank, and Mr. Whyte is the bank's Cashier and General Manager.

Home Railway Returns for 1938

Returns of the capital, traffic, receipts, working expenses, and operating results of the railway companies of Great Britain for the year 1938 have been issued by the Ministry of Transport, following on the preliminary statement published in March. The aggregate figures do not now include those of the London Transport railways.

The amount appropriated for the payment of interest and dividends in 1938 was £29,946,795, compared with £38,245,178 in 1937, £36,439,402 in 1936, £34,348,660 in 1935, £33,113,722 in 1934, and £30,832,409 in 1933. These figures represent 2.68 per cent., 3.43 per cent., 3.26 per cent., 3.08 per cent., 2.97 per cent., and 2.76 per cent., respectively, upon the total capital receipts. On ordinary stock issued, the average return per cent. was 0.58 in 1938, against 1.79 in 1937, 1.44 in 1936, 0.96 in 1935, 0.86 in 1934, and 0.76 in 1933.

The length of road open for traffic at December 31, 1938, was 20,007 miles, a decrease of 73 miles. Expressed as single track, the total mileage of running lines was 36,739 (a decrease of 60 miles), and of sidings 15,617 miles (a decrease of 10 miles). Of traffic locomotives there were 19,646 steam, against 19,750, electric 13 (the same), and petrol, oil, and oil electric 43 (the

same). Among rail-motor vehicles are included 1,991 electric (against 1,874), and 126 "other" (against 123). Passenger-carrying vehicles together numbered 43,492, a decrease of 190. The number of merchandise and mineral vehicles increased from 656,834 to 663,589, and the total tonnage capacity of these vehicles, excluding brake vans (13,605) was 7,807,629, an increase of 132,218 tons. The average capacity per vehicle rose from 11.93 tons to 12.01 tons. Twelve-ton wagons have increased in number from 154,118 in 1925 to 338,728 in 1937 and 357,330 in 1938. Of wagons (other than special vehicles) of 20 tons capacity and over, there were 34,732 at the close of 1938, of which 30,428 were allocated specially to mineral traffic. Corresponding figures at the end of 1937 were 34,274 and 30,097 respectively. Private owners' vehicles registered in 1938 included 4,593 12-ton and 492 20-ton coal wagons, compared with 9,342 12-ton and 749 20-ton wagons in 1937. Railway-owned containers have increased from 6,290 in 1931 to 13,034 in 1936, 13,845 in 1937, and 15,511 in 1938.

Total receipts from passengers in 1938 were £58,622,769, an increase of £34,255. First class ordinary receipts amounted to £3,875,772, a decrease of £39,057 or 1 per cent., and third class ordinary receipts to £42,174,152, a de-

BRITISH RAILWAY CAPITAL, 1938

	£
Capital authorised	1,264,769,048
Capital created	1,183,870,639
Capital issued	1,126,946,957
Deduct balance of nominal additions and deductions ...	44,579,344
Capital issued (excluding nominal additions and deductions) ...	1,082,366,713
Add balance of premiums and discounts	33,918,650
Deduct calls in arrear and amount uncalled	22,424
Sinking fund debenture stock redeemed	250,000
Total capital receipts	1,116,512,939
Capital expenditure:—	
On railway	1,032,563,026
On road vehicles	4,608,373
On steamboats, &c.	9,093,697
On docks, harbours, and wharves	71,824,898
On hotels	9,796,278
On electric power stations, &c.	2,806,983
Subscriptions to companies other than railway	12,224,615
Total capital expenditure ...	1,199,214,215
Capital expenditure in excess of capital receipts	82,701,276
Total capital powers and other assets available for further expenditure	11,638,206

crease of £191,779 or 0.45 per cent. Passenger journeys at standard fares were 13.50 per cent. of the total ordinary passenger journeys in 1938 as against 64.97 per cent. in 1924, and the corresponding receipts were 14.70 per cent. in 1938 and 65.59 per cent. in 1924. Third class season ticket receipts rose by 10.03 per cent. from £6,223,795 to £6,845,276. Second-class season ticket receipts were only £51, compared with £393,785 in 1937, because of their abolition on the L.N.E.R., and first class season ticket receipts fell from £1,521,273 to £1,519,832. Alone among the four main-line companies the L.N.E.R. had an increase—from £303,376 to £311,384—in first class season ticket receipts. Gross receipts from parcels and miscellaneous passenger train traffic (excluding mails and parcels post) in 1938 were £12,595,899, a decrease of £140,769. Total passenger train receipts amounted to £75,295,526, or £78,501 more than in 1937.

The total volume of higher class merchandise fell from 50,318,949 tons in 1937 to 44,276,322 tons in 1938. Of minerals and merchandise (Classes 1-6) 47,380,367 tons were conveyed in 1938, against 58,683,288 tons in 1937, and the weight of coal, coke, and patent fuel fell from 188,149,287 tons to 172,772,767 tons. Excluding free-hauled traffic, the average haul for higher class merchandise and livestock was 109.88 miles in 1938, compared with 105.94 miles in 1937, and the average ton-mile receipt was 2.004d., against 1.948d. For minerals and merchandise (Classes 1-6) the average haul rose from 64.01 miles to 66.01 miles, but the average ton-mile receipt fell from 0.966d. to 0.960d. The average haul for coal, &c., rose from 43.50 miles to 43.87 miles, and the average ton-mile receipt from 1.037d. to 1.075d. Expenditure on railway working increased from £136,135,587 in 1937 to £137,666,223 in 1938.

TABLE OF REVENUE RECEIPTS AND EXPENDITURE

	Year 1937			Year 1938		
	Gross receipts	Expenditure	Net receipts	Gross receipts	Expenditure	Net receipts
Railway	£171,391,608	£136,135,587	£35,256,021	£164,726,001	£137,666,223	£27,059,778
Road transport	707,878	579,365	128,513	706,376	571,874	130,502
Steamboats	4,187,598	3,476,791	710,807	4,100,346	3,490,384	609,962
Canals	168,682	233,348	Dr. 64,666	171,497	237,067	Dr. 65,570
Docks, harbours, and wharves ...	7,469,288	6,461,348	1,007,940	6,709,867	6,107,427	602,440
Hotels, refreshment rooms, and cars	6,068,516	5,492,456	576,060	6,050,259	5,527,625	522,634
Collection and delivery of parcels and goods ...	5,401,009	6,501,706	Dr. 1,100,697	5,184,615	6,308,464	Dr. 1,123,849
Other separate businesses	33,191	85,582	Dr. 52,391	21,994	67,095	Dr. 45,101
Total	195,427,770	158,966,183	36,461,587	187,666,955	159,976,159	27,690,796
Miscellaneous receipts (net):—						
Rents (houses, lands, hotels, lump sums, &c.)			3,447,757			3,484,857
Interest and dividends from investments in other undertakings			1,004,187			1,131,793
Transfer fees			22,927			19,604
General interest			528,230			333,490
Special items			482,548			435,287
Total net receipts			41,947,236			33,095,827
Deduct miscellaneous charges (interest on superannuation funds, chief rents, rent charges, rents of leased undertakings, &c.)			3,262,853			3,338,273
Net revenue for the year			38,684,383			29,757,554
Balance brought forward from last year's account			254,196			371,910
Special items			Dr. 316,161			33,933
Appropriation from general reserve			223			438
Amount available for appropriation			38,622,641			30,163,835

STAFF AND LABOUR MATTERS

Decision of Chairman of the R.S.N.T.—Engine Cleaners

Decision No. 8 of the Chairman of the Railway Staff National Tribunal deals with a claim by the National Union of Railwaymen and the Associated Society of Locomotive Engineers & Firemen. The claim is one of the interpretation of existing agreements or decisions. The relevant text, of which an interpretation is sought, is in the following words:—

"In order, however, to give relief to the lowest paid workers we make the following awards: (a) All adult male and female staff in the conciliation grades whose base rate is now less than 45s. a week shall receive an addition to their base and current rates of 1s. a week"

In contesting the application of this award to engine cleaners aged 20 and 21 years the railway companies rely upon three arguments:—

(i) That the tribunal intended to limit the increase to the "lowest paid workers" and that engine cleaners do not fall within this description.

(ii) That the base rate of all engine cleaners should be considered, for the purpose of applying the award, as the 48s. a week to which the rate rises automatically at the age of 22.

(iii) That the tribunal stated in Decision No. 3 that the parts of National Wages Board Decision No. 119 not affected by the awards on claims I and II (which dealt with the termination of percentage deductions and the restoration of standard rates for overtime, etc.) would continue to be effective; and that therefore the provision in paragraph 101 of that decision that engine cleaners of 20 and 21 years should receive 7s. a day remained in force.

The Chairman states that he does not consider that any of these arguments is valid for the following reasons:—

"(i) The phrase 'lowest paid workers' was in my view merely descriptive of the workers subsequently defined, namely those who, being not less than 20 years of age, had a base rate of less than 45s. a week. If the tribunal had intended to exclude a specific section of workers from the general rule it would, in my view, have done so, not by a descriptive phrase in the preamble to the award but by an explicit and unambiguous exception in the award itself.

"(ii) I am of opinion that the tribunal, in referring to the 'base rate' meant the rate for each set of workers exclusive of special payments for overtime, etc., or the operation of a sliding scale related to the cost of living, and not the rate to which pay might rise automatically after a certain period or at a certain age.

"(iii) The note as to the remainder of Decision No. 119 being effective

appears at the conclusion of the awards on claims I and II and not as a note at the end of, and as applicable to, the whole of Decision No. 3. In the context it must, in my view, be understood as relating only to the subjects affected by those claims, i.e., to the percentage deductions from earnings or restoration of overtime, etc., rates, and not to completely different matters."

In these circumstances and for these reasons the Chairman finds in favour of the claim.

National Union of Railwaymen's Claim

After the meeting on August 14 when the general managers of the four main-line companies informed the representatives of the National Union of Railwaymen, who are claiming a 50s. minimum wage, that their present financial position did not justify any further increase in the minimum wage of 45s. which had recently been conceded, the union called a special delegate conference for Tuesday, August 22, to consider the position which had arisen.

Mr. J. Marchbank, General Secretary of the National Union of Railwaymen, speaking at Abergavenny, declared that settlement of the railwaymen's claim for the 50s. minimum wage had become a matter of urgency in the dangerous development of the international situation. It was not pleasant, he went on, to have the railwaymen's conditions of working life made the subject of gibes and sneers in the Nazi German propaganda against this country. That, however, was the case in repeated broadcasts through German radio stations. Germany's rulers, while mercilessly exploiting the German workers, mocked at conditions of life in this country, which forced many thousands of railwaymen to live on less than a living wage. The union was satisfied that public opinion supported the men's claim.

After the meeting on Tuesday, Mr. Marchbank made the following official statement:—

A report of the negotiations that had taken place since the last special conference was held was given. The attitude adopted by the companies in declining to concede more than the amount that had already been conceded was fully outlined. The conference adopted the following resolution:—

That this special general meeting, after reviewing the report of the negotiating committee, expresses its strong disapproval of the negative answer of the railway companies to our claim for a 50s. a week minimum adult rate. We note the companies are not adverse to the claim being presented for consideration to the Railway Staff National Tribunal and, believing that our case is an unanswerable one, we instruct the executive committee to submit the matter to the National Tribunal without undue delay, the result of such submission being placed before a special general meeting.

The delegate conference therefore has decided to utilise the machinery of nego-

tiation for the pursuance of the claim, and when a decision has been given the delegate conference will be recalled to consider the position in the light of the findings.

The view held, Mr. Marchbank added, was that, as there was machinery to which they were all parties, that machinery should be used; more particularly as on the last occasion when they were before the tribunal the 50s. minimum adult rate was also accompanied by a number of other claims by the union. On this occasion it was the union's only claim.

Associated Society of Locomotive Engineers & Firemen's Claims

When the general managers of the four main-line railway companies met representatives of the Associated Society of Locomotive Engineers & Firemen on August 16 they declined the claims of the society for improved rates of pay, increased holidays, increased minimum payment for Sunday duty, and the abolition of the arrangements whereby men may be rostered for duty over eight hours and up to nine hours a day, on the grounds that the increase in the minimum wage of the lowest paid men was the maximum concession they could afford in their present financial position. The general managers urged the society to refer the claims to the Railway Staff National Tribunal for decision, pointing out that since the claims were considered by that body in January last there had been a change in the circumstances which justified a re-hearing by that body.

The society, however, took the view that it was in order in continuing the present method of negotiations, and quoted Clauses 18 and 19 of the Agreement in regard to Machinery of Negotiation for Railway Staff in support of that view. Following the meeting the society conducted a campaign throughout the country in support of its policy of calling a strike unless its claims were conceded, and Mr. W. J. R. Squance, speaking at Kentish Town on Sunday last said that if one judges by the resolutions coming in from the branches there is a feeling overwhelmingly in support of the Executive Committee's strike policy. "The companies have expressed their willingness to go back through the Machinery of Negotiation," he added, "but I am afraid our men have lost confidence in that machinery."

The campaign culminated in a meeting of the Executive Committee of the society on Tuesday, August 22, which lasted all day. At the close of the meeting Mr. W. J. R. Squance said it had been decided to send the following letter to the four main-line railway companies:—

My Executive Committee in session to-day has given very careful consideration to the replies received from our branches regarding policy on the programme items in dispute between this society and the railway general managers, and they have adopted a resolu-

tion to the effect, that, as the replies indicate a majority decision in support of the policy of strike action, we hereby decide to call for a complete withdrawal of the labour of our members employed on the four main-line group railways on and from midnight, Saturday, August 26.

A copy of the letter was dispatched to the Ministry of Labour, and other copies, together with copies of the resolution, were sent to the head offices of the railway companies.

Mr. Squance, General Secretary of the Associated Society of Locomotive Engineers & Firemen, stated on August 22 that the decision of the National Union of Railwaymen to re-submit its claim to the tribunal did not affect the decision of his society. "Unless something occurs in the meantime," he added, "we shall cease work at midnight on Saturday."

Mr. Squance and Mr. Evans, Secretary and President respectively of the Associated Society of Locomotive Engineers & Firemen, had an interview which lasted for two hours with Mr. F. W. Leggett of the Ministry of Labour on Wednesday, August 23, during which there was a general discussion of the situation.

Existing Wages

All engine drivers who have been five years in their grade are guaranteed a minimum payment of 90s. a week for 48 hours' work. All firemen are guaranteed a minimum of 66s. a week after four years' service as fireman, and 72s. a week after 10 years as a fireman, for 48 hours' work. The average weekly earnings are:—

Engine drivers	s. d.
Firemen	101 9
Adult engine cleaners	79 4
	57 9

These figures represent the average earnings of enginemen on all descriptions of trains, but the earnings of enginemen on the principal express passenger trains are much higher, and in some cases amount to as much as £9 for engine drivers, and £7 10s. for firemen for a week's work of less than 48 hours.

NEW SPEED RECORD FOR UNITED STATES FREIGHT TRAINS.—The American railways established a new record in the average speed of freight trains in the first six months of 1939, according to Mr. J. J. Pelley, President of the Association of American Railroads. The average speed, according to reports, for the first half of the year was 64·1 per cent. higher than in the same period of 1920. For the first half of this year the average distance travelled per train per day was 405 miles, compared with 400 miles in 1938 and 247 miles in 1920. This represents the average time required for the movement of all freight trains between terminals, including all delays en route. In numerous instances the schedules provide for a speed equal to that formerly maintained by many passenger trains.

Institution of Railway Signal Engineers

Summer meeting at Nottingham

The annual summer meeting of the Institution of Railway Signal Engineers was held at Nottingham from August 18 to 20, with a smaller attendance than usual largely because of its being necessary to hold the meeting at a rather less convenient time than on former occasions. The party was under the leadership of the President, Mr. James Boot, Signal Engineer, General Railway Signal Co. Ltd., who was supported by:—

Mr. H. W. Moore (Vice-President), Assistant Mechanical and Electrical Engineer and Signal Engineer, L.M.S.R. (Northern Division); Messrs. F. Downes, G. H. Crook, C. Carslake, and W. S. Roberts, past presidents; Messrs. W. R. Jones and F. J. Dutton, members of council; and Mr. T. S. Lascelles, Honorary Treasurer.

On the afternoon of August 18 members paid a visit to the new mechanised marshalling yard of the L.M.S.R. at Toton Down Sidings, a full description of which appeared in THE RAILWAY GAZETTE for the same date, page 233; the party was met by Colonel J. Watkins, Assistant Divisional Superintendent of Operation, Derby; Mr. A. F. Bound, Signal & Telegraph Engineer; Mr. F. J. Dutton, Divisional Signal & Telegraph Engineer, Derby; Mr. D. White, Assistant Divisional Signal & Telegraph Engineer; and Mr. T. H. Wakefield, District Controller. Parties were then conducted round the entire yard and the working was fully explained by Mr. G. J. Aston, Assistant District Controller; Chief District Inspector Jones, and technical assistants. A reprint of the article in last week's issue had previously been distributed to assist members.

On Saturday, August 19, a whole day motorcoach tour was made, going from Nottingham *via* Rufford Abbey, Edwinstowe, Clipstone, Mansfield, Chesterfield, Hathersage, Hope Castleton, and Chapel-en-le-Frith to Buxton, where lunch was taken there at the invitation of the General Railway Signal Co. Ltd. Mr. Boot presided and welcomed those taking part in the meeting on behalf of that company, to which Mr. H. W. Moore replied. Messrs. W. S. Roberts and C. Carslake also spoke. Telegrams were sent to Mr. M. G. Tweedie, Hon. Secretary of the institution, who has been indisposed for some time, expressing regret at his absence, and to Mr. W. S. Every, Signal Engineer, London Transport, who has recently had to undergo an operation.

Leaving Buxton the tour was continued *via* Monsal Dale to Bakewell where, at the invitation of Mr. T. C. Elliott of the company's London office, a short visit was paid to the works of the D.P. Battery Co. Ltd. Members were able to see the waterwheel, constructed in 1827 by Richard Arkwright, driving generating plant. Mr. Elliott entertained the party to tea in

Bakewell, after which the journey was Matlock, Ambergate, and Ripley.

In the evening a dinner was held at the Victoria Station Hotel, Nottingham, Mr. Boot again presiding; the guests of the institution were Colonel H. Rudgard, Divisional Superintendent of Operation, L.M.S.R., Derby, and Miss Rudgard; Mr. T. H. Wakefield and Miss Wakefield; and Mr. C. E. Hopson.

Mr. Boot proposed "Our Hosts" and expressed the thanks of those present to Colonel Rudgard and the L.M.S.R., and to Mr. Hopson and others concerned with the admirable arrangements made for the party's entertainment and instruction that day, as well as to the D.P. Battery Co. Ltd. and Mr. Elliott; the visit to the Bakewell works had been a surprise item in the arrangements. He read a telegram received from Mr. Tweedie in reply to the one despatched from Buxton.

Colonel Rudgard, replying, spoke of the results achieved at the Toton yard; the apparatus was admirably designed and had worked remarkably well. Signal engineers were very estimable individuals, he found; it was, however, highly inadvisable to get into their clutches as they then tied you up so that you could work no traffic at all.

Mr. Hopson and Mr. Elliott both thanked the Chairman for his appreciative remarks and expressed their pleasure at being able to contribute to the success of the meeting. Mr. Elliott referred to the kindness of the G.R.S. Company in arranging for the lunch at Buxton.

Mr. H. W. Moore proposed "The Visitors" and briefly referred to Colonel Rudgard's ability as an engineer and traffic officer. He envied the lucky position of gentlemen like Mr. Hopson, whose industries were paying so well; they would confer a boon on the railways if they would send all their traffic over them in future.

Mr. H. Wakefield responded for the visitors. He spoke of the engineering capabilities displayed by the contractors who had equipped the Toton yard, with whom his own relations had throughout been most cordial.

After dinner there was a dance, with Mr. J. H. Anderson as M.C.; music was provided by Rube Sunshine and band. On Sunday, August 20, a short coach tour was made to points of interest in Nottingham. The arrangements for the meeting, which finished after lunch on Sunday, were made by a committee consisting of the President, Mr. Boot; the Vice-president, Mr. Moore; and Messrs. R. S. Griffiths, G. H. Crook, E. L. Castle, C. H. Hills, R. F. Morkill, and the Hon. Secretary of the institution, Mr. M. G. Tweedie.

NOTES AND NEWS

Hungarian Railway Mileage.—Before its recent increase of territory, Hungary had 7,642 km. (4,749 miles) of railways. After the first annexation, this had been increased to 8,708 km. (5,411 miles), and after the second, to 9,131 km. (5,674 miles).

L.N.E.R. Steamer Aground.—Dense fog early on August 16 caused the L.N.E.R. steamer *Prague*, with more than 250 passengers from the Hook of Holland on board, to run aground in Harwich harbour. The mishap took place at 6 a.m. at low water and the *Prague*, which was at no time in danger, was refloated at 9.30 a.m., arriving at Parkstone Quay between three and four hours late.

Leopoldina Railway Loan.—The Leopoldina Railway announces that the Brazilian Government, by decree, has authorised a loan to the company of 10,000 contos per annum for 3 years on advantageous conditions implying no burden upon the company until after its net revenue results represent a return to dividend-earning capacity. The proceeds of the loan are to be applied to necessary re-equipment of the line.

Great Western of Brazil Railway Co. Ltd.—The directors announce the signature by the President of the United States of Brazil, of a decree, dated August 3, 1939, revising the company's lease contract (inter alia) as follows: (1) The granting of a loan of 40,000 contos of reis for restoration and improvement of equipment, repayable out of net receipts after providing for interest and amortisation of debentures and capital; (2) The company waives its claim for short-earnings under the 1920 contract and the Federal Government agrees to repay in federal bonds that part of the company's recognised capital which, at the date of reversion of the company's system, has not been amortised. The new contract has yet to be signed by the Minister of Transport and also registered in the Brazilian Government's offices before it becomes effective.

Flat-Bottom Rails on L.N.E.R.—The first length of flat-bottom track to be laid on the L.N.E.R. was installed on July 2 on the Edinburgh-Glasgow down main line near Bishopbriggs about 4 miles from Glasgow (Queen Street). The track is made up of flat-bottom rails of 110 lb. per yd. British Standard section laid with two types of fastenings. In one case rolled steel base plates are used, and these and the rails are held in place by elastic rail spikes. The other length is laid on cast-iron base plates fixed to the sleepers with standard chair screws. With this type of base plate the rail is held in position by means of hook bolts and clips. Illustrations are reproduced on page 294. The L.M.S.R. through its Chief Engineer, Mr. W. K. Wallace, gave every facility for inspecting that company's flat-bottom track. The two lengths of 660 yd. of each

type on the L.N.E.R. have similar fastenings to two of the L.M.S.R. types as described in THE RAILWAY GAZETTE of January 13 and 27, 1939.

Collision at Swiss-Italian Frontier.—A passenger train travelling at high speed was derailed on August 11 near Domodossola, the Swiss-Italian frontier station on the Simplon line. The train is stated to have been composed of two passenger coaches and about 60 goods trucks, and the cause of the accident is said to have been faulty braking. Six persons are reported to have been killed.

Hartlepool Local Train Service.—The decision regarding the fate of the Hartlepool to West Hartlepool railway service has been deferred until the end of the year, according to a statement in the *Yorkshire Post*. When it was proposed to discontinue the service last January, the Mayor appealed to the L.N.E.R. to review the position and, as a result, the service was continued on a half-hourly basis.

"The Iron Road to the West."—This is the title of an item which, the B.B.C. announces, listeners to the National programme will hear on September 22. It is the story of a journey by rail from Paddington to Penzance, of the train itself, and the men whose work makes the journey possible. Signalmen, engine-drivers, ticket inspectors, chefs, and others will describe their duties, and the recorded voice will be heard of a former head guard on Paddington-Penzance expresses, who remembered Brunel and who died recently at the advanced age of 99.

L.M.S.R. Quota League Results.—Receipts of districts engaged in the L.M.S.R. Quota League competition are published for the five months January-May in the August issue of *Quota News*. Birmingham heads the passenger competition for England and Wales, its receipts of £672,816 being 100·67 per cent. of its quota and an increase of 5·86 per cent. on 1938. In this competition all districts except Manchester and South-West and Central Wales have improved their receipts. In Scotland the passenger league is headed by Inverness with £70,521, or 98·39 per cent. of its quota and an improvement 0·09 per cent. on last year. All other Scottish districts record decreased passenger results. In the freight competition the S.W. and Central Wales district heads the England and Wales section with 145·24 per cent. of quota and an increase of 29·17 per cent. on last year. Perth leads in the Scottish freight competition, obtaining 106·82 per cent. of quota and an advance of 3·37 per cent. in 1938. The England and Wales coal league leader is Stoke (111·99 per cent. of quota and + 14·23 per cent. on last year). Inverness scored a double victory in Scotland by winning the coal competition with 120·09 per cent. of its quota

and a 20·09 per cent. improvement on last year's takings.

Civil Engineers' Visit to U.S.A.—The Institution of Civil Engineers accepted an invitation some time ago from the American Society of Civil Engineers to participate in a British American Engineering Congress in New York and to visit the World's Fair and various places of engineering interest. The party will sail from Liverpool on August 26, arriving at Boston on September 3. They will be received by the Boston Committee of the North Eastern Section of the American Society of Civil Engineers jointly with the Boston Society of Mechanical Engineers. The congress opens on September 4 in New York, at which papers will be read and discussions take place. There will also be visits to tunnels, bridges, sewage treatment works, parkways, and other places of general interest. On the evening of Wednesday, September 6, a banquet will be held at the Hotel Waldorf-Astoria, at which there will be speeches by some prominent British and American engineers: the speeches will be broadcast throughout the United States. A tour will follow of Washington, Niagara, Hamilton, Toronto, Ontario and Montreal. It is 35 years ago since an official visit to America was made by a representative body of members of the institution. (See also page 297.)

A Novelty in Electric Torches.—We recently attended a demonstration of a special type of electric torch, which is claimed by the maker, the Sterling Manufacturing Co. Ltd., to be entirely impervious to damage and rough handling. This quality is attained by surrounding the torch with a solid rubber case, with a screwed cap at one end, a quarter turn of which effects on or off switching. Incorporated in the rubber case are (a) a percussion spring which holds the battery in position, thereby protecting the lamp-bulb from damage if the torch is dropped violently; (b) contact mechanism, protected by the percussion spring, which provides contact between the battery and the lamp-bulb; (c) a metal strip, running longitudinally inside the case, and providing a continuous sliding contact with the surface of the battery (a small panel of the cardboard covering being cut away for this purpose). The torch can be used with any type of dry battery, weighs no more than 1½ lb., and is fitted with a lace waist sling, threaded through a hole in the end cap. There is no metal on the body of the torch, so that it can be employed with safety for all electrical work.

Forthcoming Events

- Aug. 26 (Sat.).—Institutions of Civil and Mechanical Engineers. Visit to United States and Canada.
Sept. 2 (Sat.).—Permanent Way Institution (Manchester-Liverpool), at Southport. "The Cheshire Lines," by Mr. K. Marrian.
Sept. 5-8.—Institute of Metals, at Glasgow. Annual Autumn Meeting.

L.N.E.R. Electrification in London and the Pennines

The L.N.E.R. reports good progress with its large electrification schemes now in hand. In the Liverpool Street—Sheffield scheme, some two miles of overhead girders, which will eventually carry the electric transmission wires, have been erected between Harold Wood and Brentwood. Ilford locomotive shed has been demolished, and the carriage sidings removed in preparation for the new layout of electric lines; the new carriage sidings at Thornton Fields are being used in place of the sidings at Ilford.

Overhead girders have also been erected for a distance of seven miles at Woodhead, Hadfield, and Sheffield in connection with the Manchester—Sheffield main line electrification. For the 3-mile long Woodhead tunnel, special overhead equipment is being provided; the work in the tunnel is being carried out mainly on Sundays. This scheme, when completed, will be the first in this country in which all

passenger services will be maintained by electric multiple unit trains or main line trains hauled by electric locomotives; the latter will also haul all freight trains. At Darnall, near Sheffield, where steam trains from the south and east will be taken over by electric locomotives, work is proceeding rapidly on the first main line steam and electric locomotive depot in the country. A new flyover bridge to enable locomotives to get from the "up" side to the depot without crossing the main lines on the level has just been completed.

Excellent progress is also being made with the electrification schemes which the L.N.E.R. has in hand in conjunction with London Transport. The site for the extension of Finsbury Park station has been cleared, and foundations for the necessary girder work have been put in hand. The North Woolwich Line has been bridged to take the tube tracks and new platforms.

British and Irish Railway Stocks and Shares

Stocks	Highest 1938	Lowest 1938	Prices	
			Aug. 23, 1939	Rise Fall
G.W.R.				
Cons. Ord.	651 ⁴	253 ⁴	27	-2 ¹ ₂
5% Con. Prefce.....	118 ³ ₄	74	81 ¹ ₂	-4 ¹ ₂
5% Red. Pref. (1950) ..	111 ³ ₄	90	92 ¹ ₂	-2
4% Deb.	111	97 ¹ ₂	93 ¹ ₂	-4
4% Deb.....	112 ⁵ ₁₆	100 ¹ ₂	97 ¹ ₂	-2 ¹ ₂
4% Deb.....	118 ¹	104	102	-3
5% Deb.....	131 ¹ ₂	119	112 ¹ ₂	-2
2% Deb.....	69 ³ ₄	60	58	-1
5% Rt. Charge	129	114	106	-4 ¹ ₂
5% Cons. Guar.	128 ¹ ₂	103	99	-5 ¹ ₂

L.M.S.R.				
Ord. ...	301 ²	11	12	-1
4% Prefce. (1923) ...	701 ⁴	23	34 ¹ ₂	-5
4% Prefce. ...	821 ⁴	43 ⁴	50 ¹ ₂	-4 ¹ ₂
5% Red. Pref. (1955) ...	103 ¹	66	77 ¹ ₂	-1 ¹ ₂
4% Deb. ...	105 ¹ ₁₆	85	87 ¹ ₂	-4
5% Red. Deb. (1952) ...	114 ¹	105	106	-1 ¹ ₂
4% Guar. ...	102 ³	77 ¹ ₂	75	-4 ¹ ₂

L.N.E.R.				
5% Pref. Ord. ...	8 ⁹ ₁₆	3 ¹ ₂	4	-1 ¹
Def. Ord. ...	47 ¹ ₁₆	21 ¹ ₈	27 ⁸	—
4% First Prefce. ...	68 ¹ ₄	21	28 ¹ ₂	-4
4% Second Prefce. ...	27 ¹ ₄	8	10	-1
5% Red. Pref. (1955) ...	97	40 ¹ ₄	46	-3 ¹ ₂
4% First Guar. ...	97 ¹ ₂	66 ¹ ₄	63 ¹ ₂	-4
4% Second Guar. ...	91 ¹ ₄	52	54 ¹ ₂	-4 ¹ ₂
3% Deb. ...	79 ¹ ₄	60	58 ¹ ₂	-2 ¹ ₂
4% Deb. ...	104 ¹ ₈	77	78 ¹ ₂	-3
5% Red. Deb. (1947) ...	110 ⁹ ₈	97	103 ¹ ₂	—
4% Sinking Fund Red. Deb. ...	108 ¹ ₁₆	101	98	—

SOUTHERN				
Pref. Ord. ...	87	47 ¹ ₂	58	-4
Def. Ord. ...	21 ⁵ ₄	9 ¹ ₄	12	-1
5% Pref. ...	115	83	82	-6
5% Red. Pref. (1964) ...	115 ¹ ₂	98	98 ¹ ₂	-1
5% Guar. Prefce. ...	128 ¹ ₂	106	105	-2 ¹ ₂
5% Red. Guar. Pref. (1957) ...	116	108 ¹ ₂	105	-1 ¹ ₂
4% Deb. ...	109 ¹ ₄	95	93 ¹ ₂	-4
5% Deb. ...	129	117	112 ¹ ₂	-2
4% Red. Deb. 1962-67 ...	107	101 ¹ ₂	101 ¹ ₂	-1 ¹ ₂

BELFAST & C.D.				
Ord. ...	4	3 ¹ ₂	4	—

FORTH BRIDGE				
4% Deb. ...	102	99 ¹ ₈	83 ¹ ₂	-9
4% Guar. ...	103 ¹ ₄	94 ¹ ₂	82 ¹ ₂	-5

G. NORTHERN (IRELAND)				
Ord. ...	5 ¹ ₂	2 ¹ ₂	4	—

G. SOUTHERN (IRELAND)				
Ord. ...	25 ¹ ₂	8 ¹ ₂	9 ¹ ₂	—
Prefce. ...	35	13	11	+1 ¹ ₂
Guar. ...	70 ¹ ₄	30 ¹ ₁₆	26 ¹ ₂	—
Deb. ...	83	56	47	—

L.P.T.B.				
4% "A" ...	119 ⁹ ₈	107 ¹ ₂	104 ¹ ₂	-2
5% "A" ...	130	117	109 ¹ ₂	-4
4% "T.F.A." ...	108	98	102	-1
5% "B" ...	122 ¹ ₁₆	105	103 ¹ ₂	-2
5% "C" ...	84	68	66 ¹ ₂	-4

MERSEY				
Ord. ...	24 ¹ ₄	16 ¹ ₂	22	—
4% Perp. Deb. ...	102 ⁷ ₈	94 ³ ₄	90	—
3% Perp. Deb. ...	77	69	65 ¹ ₂	—
3% Perp. Prefce. ...	66 ¹ ₂	57	52 ¹ ₂	—

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 33rd Week			Totals to Date		
	1939	1938	Inc. or Dec.	1939	1938	Inc. or Dec.
L.M.S.R. (6,828 mls.)						
Passenger-train traffic...	718,000	646,000	+ 72,000	17,392,000	17,595,000	- 203,000
Merchandise, &c. ...	487,000	416,000	+ 71,000	15,470,000	14,872,000	+ 598,000
Coal and coke ...	255,000	236,000	+ 19,000	8,697,000	8,242,000	+ 455,000
Goods-train traffic ...	742,000	652,000	+ 90,000	24,167,000	23,114,000	+ 1,053,000
Total receipts ...	1,460,000	1,298,000	+ 162,000	41,559,000	40,709,000	+ 850,000
L.N.E.R. (6,320 mls.)						
Passenger-train traffic...	466,000	443,000	+ 23,000	11,258,000	11,314,000	- 56,000
Merchandise, &c. ...	340,000	286,000	+ 54,000	10,599,000	10,474,000	+ 125,000
Coal and coke ...	263,000	219,000	+ 44,000	8,263,000	7,763,000	+ 500,000
Goods-train traffic ...	603,000	505,000	+ 98,000	18,862,000	18,237,000	+ 625,000
Total receipts ...	1,069,000	948,000	+ 121,000	30,120,000	29,551,000	+ 569,000
G.W.R. (3,737 ¹ / ₂ mls.)						
Passenger-train traffic...	320,000	291,000	+ 29,000	7,386,000	7,394,000	- 8,000
Merchandise, &c. ...	209,000	174,000	+ 35,000	6,614,000	6,068,000	+ 546,000
Coal and coke ...	101,000	104,000	- 3,000	3,673,000	3,537,000	+ 136,000
Goods-train traffic ...	310,000	278,000	+ 32,000	10,287,000	9,605,000	+ 682,000
Total receipts ...	630,000	569,000	+ 61,000	17,673,000	16,999,000	+ 674,000
S.R. (2,142 mls.)						
Passenger-train traffic...	464,000	420,000	+ 44,000	11,073,000	11,013,000	+ 60,000
Merchandise, &c. ...	62,000	61,000	+ 1,000	2,029,500	1,981,500	+ 48,000
Coal and coke ...	30,000	31,000	- 1,000	1,047,500	996,500	+ 51,000
Goods-train traffic ...	92,000	92,000	—	3,077,000	2,978,000	+ 99,000
Total receipts ...	556,000	512,000	+ 44,000	14,150,000	13,991,000	+ 159,000
Liverpool Overhead (6 ¹ / ₂ mls.)						
Mersey (4 ¹ / ₂ mls.) ...	1,580	1,484	+ 96	46,760	45,660	+ 1,100
*London Passenger Transport Board ...	4,498	4,195	+ 303	148,178	144,991	+ 3,187
Transport Board ...	570,500	539,500	+ 31,000	4,066,600	3,900,200	+ 166,400
IRELAND						
Belfast & C.D. pass. (80 mls.) ...	4,182	4,042	+ 140	88,646	86,203	+ 2,443
" " goods ...	465	452	+ 13	14,380	14,150	+ 230
" " total ...	4,647	4,494	+ 153	103,026	100,353	+ 2,673
Great Northern (543 mls.) pass. ...	18,700	17,300	+ 1,400	373,750	364,050	+ 9,700
" " goods ...	9,600	9,100	+ 500	330,550	290,300	+ 40,250
" " total ...	28,300	26,400	+ 1,900	704,300	654,350	+ 49,950
Great Southern (2,076 mls.) pass. ...	58,181	55,085	+ 3,096	1,206,976	1,208,622	- 1,646
" " goods ...	37,525	36,973	+ 552	1,318,265	1,278,346	+ 39,919
" " total ...	95,706	92,058	+ 3,648	2,525,241	2,486,968	+ 38,273

* 7th Week (before pooling)

OFFICIAL NOTICES

Royal State Railways of Thailand (Siam)

NOTICE.

SEALED Tenders for the supply of Steel-body Bogie Carriages will be received by the Superintendent of Stores, Royal State Railways, Bangkok, Thailand (Siam), up to 14.00 o'clock on the 2nd October, 1939, at which hour and date they will be privately opened in the Superintendent of Stores' Office.

Blank Tender Forms are obtainable from MESSRS. SANDBERG, 40, Grosvenor Gardens,

London, S.W.1, at the price of £10 Os. 0d. per set.

THE ADMINISTRATION,
ROYAL STATE RAILWAYS OF THAILAND
(SIAM).

WANTED.—First class Designer Draughtsman. Used to designing coach equipment and hardware. Must have initiative. Good mechanical knowledge and capable of working with minimum supervision. Apply in confidence, stating age, experience, and salary required.—Box No. 238, THE RAILWAY GAZETTE, 33, Tothill Street, London, S.W.1.

Universal Directory of Railway Officials and Railway Year Book

45th Annual Edition, 1939-40

This unique publication gives the names of all the principal railway officers throughout the world, together with essential particulars of the systems with which they are connected. Much general and statistical information about railways is also concisely presented.

Price 20/- net.

THE DIRECTORY PUBLISHING CO., LTD.
33, Tothill Street, Westminster, S.W.1

CONTRACTS AND TENDERS

L.N.E.R. Signalling Contracts

The Siemens & General Electric Railway Signal Co. Ltd. has received three contracts from the L.N.E.R. for signalling work in connection with the new electrification schemes. The work covers conversion of d.c. track circuits between Manchester-Sheffield and Wath, to a.c. operation. This includes the provision of 174 auto impedance bonds and 336 a.c. track relays. The conversion of track circuits is also being carried out on the line between Fenchurch Street and Bow Junction, including 75 auto impedance bonds and auxiliary apparatus. The third contract entails the supply and installation of a.c. track circuits and colour light signalling, with alterations and additions, to the mechanical signalling at Orgeaves, Woodhouse.

The Westinghouse Brake & Signal Co. Ltd. has received a contract from the L.N.E.R. for the signalling of the 10 route miles of line between Maryland Point and Gidea Park, forming part of the Liverpool Street-Shenfield line now being electrified. The new signalling will be four-aspect colour-light with position-light indicators at junctions, and a capacity of 40 trains an hour will be catered for. This figure is eclipsed in this country only on the Inner Circle Line of London Transport, which handles 43 trains an hour. New signal boxes of modern design will be provided with control panels showing signals and track circuits.

The Chinese Government Purchasing Commission has placed the following orders for equipment to be supplied to the inspection of Messrs. Sandberg for the Szechuen-Yunnan Railway:—

Dorman, Long & Co. Ltd.: 5,080 metric tons of 30 kg. per m. rails and 1,012 metric tons of fishplates.

United Steel Companies, Workington Branch: 2,308 metric tons of 30 kg. per m. rails.

Guest Keen Baldwins Iron & Steel Co. Ltd.: 580 metric tons of 30 kg. per m. rails.

Steel Company of Scotland: 2,032 metric tons of 30 kg. per m. rails.

Colvilles Limited: 603 metric tons of steel sleepers.

Guest, Keen & Nettlefolds: 89 metric tons of fishbolts and nuts, 337 metric tons of dogspikes, and 377 metric tons of screwspikes.

Referring to the above orders, a Reuters message states: "The Chinese Government Purchasing Commission has placed an order with a number of

British rail makers for £250,000 worth of rails for the new railway which is being built from Chungking to Yunnanfu (Kwenming) to connect with the French railway through Indo-China. The first consignment of rails is to be shipped at the end of September, and the whole order is to be completed within the shortest time possible. Other important orders are being negotiated. Most of the bed of the Chungking-Yunnanfu Railway is reported to be already made. It is expected that the railway will be finished within a year from now, when it will form an important addition to China's communications with the outside world.

German firms have secured orders for a considerable tonnage of bridgework required by the Royal State Railways of Thailand (Siam).

D. Wickham & Co. Ltd. has received orders for four petrol-driven permanent-way gang trolleys for the Entre Rios Railways and four for the Argentine North Eastern Railway.

Contracts have been placed by the L.N.E.R. for the purchase of 8,000 sleepers and 6,600 tons of cast iron chairs. The orders are shared by a dozen British firms.

Lobnitz & Co. Ltd. has received an order from the Gold Coast Government Railway for one 80-100-ton hopper barge for Takoradi Harbour, to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton.

The South Indian Railway Administration has placed orders, to the inspection of Messrs. Robert White & Partners, with Guest Keen Baldwins Iron & Steel Co. Ltd. for 47½ tons of steel keys, and with Banting & Tresilian for 7,425 solid-drawn steel boiler tubes.

The Bombay, Baroda & Central India Railway Administration has placed orders to the inspection of Messrs. Rendel Palmer & Tritton with Thos. Firth & John Brown Limited for 37 locomotive tyres, and with Steel, Peech & Tozer for two locomotive crank axles.

The English Electric Co. Ltd. has received a contract for a number of single-deck bus bodies from the Lancashire United Transport & Power Co. Ltd. In addition, repeat orders have

been received from Warrington Corporation for double-deck all-metal bus bodies, from Preston Corporation for double-deck composite bus bodies, and from the Potteries Motor Traction Company for single-deck composite bus bodies. These contracts will be carried out at the English Electric Company's Dick Kerr works, Preston.

Railcars Wanted for E. Africa

The Lourenço Marques Port & Railway Administration is calling for tenders for the supply and delivery of 20 light engine-driven railcars. Tenders should be addressed to 3a, Seccao dos Armazens Gerais Direccao dos Servicos dos Portos, Caminhos de Ferro e Transportes de Lourenço Marques, to be received by September 8. A copy of the specifications and general conditions of tender (in Portuguese) may be borrowed from the Department of Overseas Trade. Local representation is essential, and the department is prepared to furnish firms desirous of tendering for the supply of railcars of United Kingdom manufacture, and not represented in Portuguese East Africa, with the names of United Kingdom merchant houses with local connections who may be willing to handle tenders on their behalf.

B.E.N. Patents Limited, High Wycombe, Bucks, manufacturer of the well-known range of air compressors, paint spraying plant and garage equipment, has opened a new service depot and showroom at 92, Tottenham Court Road, London, W.1 (Tel. No.: MUSEum 9588). The new branch is under the management of Mr. A. Kingwell and carries a comprehensive stock of complete B.E.N. machines and spare parts, and demonstration facilities are available.

B.S.S. FOR VOLTAGE-OPERATED CIRCUIT BREAKERS.—The British Standards Institution has published a specification (No. 842) for voltage operated air-break earth-leakage circuit-breakers for use on domestic, farm and factory premises, up to medium voltage and 200 amperes. The specification covers rating, sizes of marking, certain features of design and construction, performance, and tests. Copies can be obtained from the British Standards Institution, Publications Department, 28, Victoria Street, S.W.1 (price 2s. 2d. post free).

Railway Share Market

As was to be expected, sentiment on the Stock Exchange has been entirely dominated by the latest turn of events in the international situation. Earlier in the week dealers marked prices down substantially, but selling pressure was not heavy, and when it became apparent that the City is continuing to take a calm view of the position and outlook, the undertone of markets improved, and earlier declines were partly regained. Nevertheless, the majority of securities show sharp falls on balance, and pending clarification of the international situation, the margin between buying and selling prices has remained wider than a week ago.

Movements in home railway securities reflected the surrounding tendency and should not be read as indicating any less hopeful views either in regard to the traffic outlook or the wages dispute. Indeed the past week's traffics created a good impression, and the intervention of the Ministry of Labour has increased the belief that the A.S.L.E.F. will not after all resort to strike action. For the time being it must be expected that the general trend on the Stock Exchange will be the main

factor influencing movements in home railway stocks. Not only have the junior stocks moved against holders, but on balance prior charges and debentures, which move closely with Government securities, have declined. It can reasonably be expected that prices will recover rapidly when markets have the benefit of more reassuring international news.

Great Western ordinary, which was down to 26 at one time, subsequently improved to 26½, which, however, is virtually three points below the price current a week ago. The 5 per cent. preference has fallen to 80½, while the 4 per cent. debentures were 92½. Earlier in the week, L.M.S.R. 1923 preference was marked down to 33, but later rallied moderately to 34, while the 4 per cent. preference at 50 and the ordinary stock at 12½ were also slightly above the lowest prices recorded during the week. The 4 per cent. guaranteed has been marked down to 75½, but, as in most other cases, no heavy selling was reported. L.N.E.R. first preference, which was 27 at one time, later rallied to 28, while the second preference was 9½, compared with 10½ a week ago. The guaranteed stocks

have been marked down heavily, the first being 61½, compared with 68 a week ago, and the second guaranteed 54½, compared with 59½. The 4 per cent. debentures were quoted at 78½. Southern preferred reflected the market tendency with a fall on balance from 62 to 57, while the deferred was 12½, as against 13½ a week ago. The 5 per cent. preference moved down from 88 to 81½, and is now a point higher than Great Western 5 per cent. preference. Southern 4 per cent. debentures were quoted at 93½, compared with 97½ a week ago.

In sympathy with the general tendency there was an all-round reaction in foreign railway stocks, and in the case of debentures of the Argentine companies the fall was out of proportion to the amount of selling, which was apparently only very moderate. Argentine Great Western 5 per cent. debentures were 31 and B.A. & Pacific consolidated debentures no better than 28½. American railway shares showed a rallying tendency at one time, and this continued, but Canadian Pacific were lower on balance and the preference stock was 21½. Canadian Pacific Common was 37.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1938-39	Week Ending	Traffic for Week		No. of Weeks	Aggregate Traffics to Date			Shares or Stock	Prices				
			Total this year	Inc. or Dec. compared with 1938		Totals		Increase or Decrease		Highest 1938	Lowest 1938	Aug. 23, 1939	Yield % (See Note)	
						This Year	Last Year							
South & Central America														
Antofagasta (Chile) & Bolivia	834	20.8.39	12,370	+ 670	33	421,710	514,600	- 92,860	Ord. Stk.	14	71½	6	Nil	
Argentine North Eastern	753	19.8.39	11,582	+ 571	8	80,998	84,913	- 3,915	"	61½	2	31½	Nil	
Bolivar	174	July 1939	4,200	+ 550	30	29,150	26,250	+ 2,900	6 p.c. Deb.	8	7	7	Nil	
Brazil	—	—	—	—	—	—	—	—	Bonds	10	4	51½	91½	
Buenos Ayres & Pacific	2,801	19.8.39	74,442	+ 1,675	8	548,450	538,153	+ 10,297	Ord. Stk.	61½	34½	21½	Nil	
Buenos Ayres Central	190	29.7.39	\$106,800	+ \$14,800	5	\$316,400	\$526,800	- \$10,400	Mt. Deb.	15½	8	11	Nil	
Buenos Ayres Gr. Southern	5,082	19.8.39	118,114	- 6,328	8	847,767	914,951	- 67,184	Ord. Stk.	175½	81½	55½	Nil	
Buenos Ayres Western	1,930	19.8.39	39,888	+ 4,599	8	301,117	277,356	+ 23,761	"	123½	5	43½	Nil	
Central Argentine	3,700	19.8.39	120,751	+ 17,758	8	941,145	761,440	+ 179,705	"	131½	58½	51½	Nil	
Do	—	—	—	—	—	—	—	—	Dfd.	6	21½	21½	Nil	
Cent. Uruguay of M. Video	972	12.8.39	14,904	- 1,744	7	104,690	108,658	- 3,968	Ord. Stk.	3	11½	1	Nil	
Costa Rica	188	June 1939	25,240	- 6,129	52	270,756	314,399	- 43,643	Stk.	28	22½	22½	87½	
Dorada	70	July 1939	14,500	- 4,400	30	95,100	114,600	- 19,500	1 Mt. Db.	105¼	104	102½	57½	
Entre Rios	810	19.8.39	16,985	- 1,210	8	128,203	116,320	+ 9,883	Ord. Stk.	71¼	31½	4	Nil	
Great Western of Brazil	1,092	19.8.39	4,800	- 200	33	265,000	216,900	+ 48,100	Ord. Sh.	3½	1½	5½	Nil	
International of Cl. Amer.	794	June 1939	\$433,084	+ \$7,473	26	\$3,234,011	\$3,010,488	+ \$223,523	"	—	—	—	—	
Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	6d.	6d.	1½	Nil	
La Guaira & Caracas	22½	July 1939	6,490	+ 1,145	30	41,920	35,580	+ 6,340	Stk.	8	61½	71½	Nil	
Leopoldina	1,918	19.8.39	24,597	- 1,292	33	649,534	639,944	+ 9,590	Ord. Stk.	4	1	1	Nil	
Mexican	483	14.8.39	\$240,800	+ \$10,400	7	\$1,717,100	\$1,738,300	- \$21,200	"	14	1½	18	Nil	
Midland of Uruguay	19	July 1939	9,153	- 74	4	9,153	9,227	- 74	"	19	19	12	Nil	
Nitrate	386	15.8.39	4,881	- 971	32	75,199	96,357	- 21,158	Ord. Sh.	52½	19½	15½	71½	
Paraguay Central	274	12.8.39	\$3,742,000	+ \$852,000	7	\$22,318,000	\$21,538,000	+ \$780,000	Pr. Li. Stk.	60	55½	40½	145½	
Peruvian Corporation	1,059	July 1939	64,405	- 9,649	5	64,405	74,055	- 9,649	Pref.	55½	13½	1	Nil	
Salvador	100	12.8.39	49,051	- 48,349	7	467,983	479,383	- 11,400	Pr. Li. Db.	23	20	19½	Nil	
San Paulo	153½	13.8.39	29,212	- 4,349	32	1,017,257	1,054,990	- 37,733	Ord. Stk.	64	28	21½	95½	
Taltal	160	July 1939	1,555	- 1,955	5	1,555	3,510	- 1,955	Ord. Sh.	516	1	10	Nil	
United of Havana	1,353	19.8.39	15,638	- 1,275	8	113,156	119,327	- 6,171	Ord. Stk.	39½	1½	5½	Nil	
Uruguay Northern	73	July 1939	800	- 108	4	800	908	- 108	Deb. Stk.	2	1	2	Nil	
Canada														
Canadian National	23,762	14.8.39	699,354	+ 46,631	32	22,029,504	20,682,980	+ 1,346,524	—	—	—	—	515½	
Canadian Northern	—	—	—	—	—	—	—	- 4 p.c.	Perp. Dbs.	72	60	67½	45½	
Grand Trunk	—	—	—	—	—	—	—	4 p.c. Gar.	Ord. Stk.	104	90	96	41½	
Canadian Pacific	17,171	14.8.39	524,800	+ 33,200	32	15,740,800	15,478,200	+ 262,600	"	87½	41½	4	Nil	
India†														
Assam Bengal	1,329	31.7.39	41,617	+ 6,502	18	471,531	451,919	+ 19,612	Ord. Stk.	81½	70	68½	45½	
Barsi Light	202	31.7.39	4,762	- 2,175	18	43,395	55,057	- 11,662	Ord. Sh.	60½	54½	50½	515½	
Bengal & North Western	2,112	31.7.39	64,822	- 6,275	18	913,644	1,007,222	- 93,578	Ord. Stk.	311	278	252	71½	
Bengal Docks & Extension	161	10.8.39	3,872	- 292	19	41,091	48,459	- 7,368	"	89	83	90½	75½	
Bengal Nagpur	3,267	31.7.39	194,250	+ 23,785	18	2,598,577	2,386,011	+ 210,566	"	95½	90	88½	41½	
Bombay, Baroda & Cl. India	2,988	10.8.39	178,350	- 22,275	19	3,111,450	3,176,550	- 65,100	"	112½	95	102½	75½	
Madras & Southern Mahratta	2,967	31.7.39	153,150	+ 4,161	18	2,051,484	1,960,961	+ 90,523	"	108	97	98½	79½	
Rohilkund & Kumaon	546	31.7.39	10,941	- 2,671	18	183,731	205,122	- 21,391	"	308	285	261	67½	
South Indian	2,531½	31.7.39	121,176	- 8,252	18	1,416,199	1,402,506	+ 13,693	"	104	101	94½	59½	
Various														
Beira	204	June 1939	83,026	- 425	40	719,357	60,516	+ 1,157	Prf. Sh.	78	5/6	18	Nil	
Egyptian Delta	623	31.7.39	5,932	- 425	18	61,673	60,516	+ 1,157	"	—	—	—	—	
Kenya & Uganda	1,625	May 1939	206,557	- 11,295	21	1,220,870	1,309,332	- 88,462	B. Deb.	49	41	43	8½	
Manila	—	—	—	—	—	—	—	- 2,814	Inc. Deb.	935½	89	89	4½	
Midland of W. Australia	277	June 1939	11,544	- 4,418	52	177,307	180,121	- 2,814	"	—	—	—	—	
Nigerian	1,900	8.7.39	39,388	+ 3,017	15	400,995	447,766	- 46,871	"	—	—	—	—	
Rhodesia	2,442½	June 1939	365,928	- 22,275	40	3,245,158	—	—	"	—	—	—	—	
South Africa	13,284	29.7.39	657,235	+ 32,728	18	11,077,846	10,458,407	+ 619,439	"	—	—	—	—	
Victoria	4,774	May 1939	800,924	- 54,892	48	8,666,883	9,084,032	- 417,149	"	—	—	—	—	

NOTE. Yields are based on the approximate current prices and are within a fraction of 1½

† Receipts are calculated @ 1s. 6d. to the rupee

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being over estimated. The statements are based on the current rates of exchange and not on the par value